

DIE
SPEKTREN DER ELEMENTE
BEI NORMALEM DRUCK

VON

PROF. FRANZ EXNER UND DR. EDUARD HASCHEK

ZUGLEICH II. WESENTLICH VERMEHRTE AUFLAGE
DER WELLENLÄNGENTABELLEN FÜR SPEKTRAL-
ANALYTISCHE UNTERSUCHUNGEN

BAND II

LEIPZIG UND WIEN
FRANZ DEUTICKE

1911

Verlags-Nr. 1682.

BAND II.

DIE BOGENSPEKTREN DER ELEMENTE.

Wir geben in diesem Bande die ausführlichen Bogenspektren der Elemente; sie sind geordnet nach der alphabetischen Reihe der chemischen Symbole. Die Verunreinigungen sind, wenn sie sicher erkennbar waren, aus den Tabellen weggelassen. Nur in der Gruppe der seltenen Erden, soweit dieselben chemisch noch nicht genügend getrennt sind, haben wir die Gruppenverunreinigungen unter Beifügung der betreffenden chemischen Symbole in den Tabellen belassen.

Vor jedem Elemente findet sich die Literatur der Bogenspektren angegeben, soweit dieselbe gegenwärtig noch Interesse beansprucht, sowie das Material, das wir zu den Aufnahmen verwandten, dessen Verunreinigungen und endlich die Zahl der gemessenen Linien. Wo Banden zu beobachten waren, sind die Kanten derselben ohne Intensitätsangabe dem Linienspektrum des Elementes am Schlusse beigefügt. Es bedeutet dabei die Bezeichnung K. V. oder K. R. das die betreffende Kante nach Violett, resp. Rot abgeschattiert ist.

Die Intensitätsskala der Linienspektren schließt sich der Rowlandschen an; wir bezeichnen mit 1 die Linien geringster Intensität und mit 1000 die stärksten. Von den zur Charakterisierung der Linien verwendeten Zeichen ist zu bemerken:

+	bedeutet	unscharf,
d	"	doppelt,
u	"	umgekehrt,
br	"	breit,
r	"	verwaschen nach Rot,
v	"	verwaschen nach Violett,
()	"	, daß eine Linie des eingeklammerten Elements über die gemessene Linie fällt.

I. Ad. Aldebaranium.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Akad. 119 IIa.
(1910) (Rot).

Material: Aldebaraniumnitrat aus Oxid von C. Auer v. Welsbach.

Verunreinigungen: Cp, Tm.

Linienzahl: 905.

2320·95	1	2665·10	2	2759·63	1 +	2821·27	3
90·82	1	68·80	1	60·89	2	23·69	1
2464·61	2	72·04	2	61·48	2	24·33	1
2502·12	1	72·72	3	64·54	2	25·09	3
09·19	1	74·97	1 +	65·85	1 +	26·55	1 +
12·15	2	79·65	1	68·40	1 +	27·13	1
37·75	1	80·46	1	71·19	1	28·05	3
38·77	2	83·49	1	71·45	2	31·10	3
52·25	1	84·82	2	74·86	1	32·33	1
52·81	1	88·03	1	75·06	1	33·96	1 +
61·75	1	92·09	1	76·38	3	35·09	2
71·45	1 +	92·50	1 +	76·68	1	38·76	1 +
78·87	1 +	95·51	1	77·15	1	39·02	1
88·36	1	96·70	1	77·56	1 +	39·19	1 +
96·25	1	97·57	1	79·65	1	39·97	1 +
96·40	1	2700·86	1	80·95	1 +	41·46	1
2604·10	1	01·80	2	84·76	2	42·25	1
13·49	1	08·91	1	85·16	2	42·40	1
15·50	3 Cp	09·76	1	91·70	1	42·69	1
17·10	2	10·62	2	92·26	1	44·78	2 Tm.
19·15	1	10·72	1	93·38	1	47·30	4
19·33	1	11·86	1	94·51	1	47·60	3 Cp?
24·41	1	12·72	2	94·69	2	48·56	3
34·37	1	15·50	1 +	95·18	1	49·00	1
39·51	1	16·00	1	96·71	2	49·45	1
40·83	1	18·43	2	97·38	2 d	51·28	4
41·97	2	21·25	2	97·90	1	53·51	1
42·61	1	22·26	2	98·10	1	53·79	1
44·39	2	29·14	1 +	98·33	2	54·26	2
46·53	1	32·80	2	99·48	2	54·60	1
47·54	1	33·18	1	2800·12	2	55·00	1 +
48·86	1	34·15	1	00·50	1	58·48	2
49·85	1	41·80	2	04·35	1	58·55	1 +
50·35	1	45·78	1	08·10	1	59·50	2
50·80	1	48·13	1	08·50	1	59·90	3
53·82	3	48·77	3	10·80	1	60·50	1
56·20	1	50·59	4	12·37	1 +	61·34	3
56·88	1 +	51·54	2	14·61	2	61·44	2
57·88	1	54·27	2	16·45	1	61·83	1
58·55	1 +	55·03	1	17·40	1 +	65·45	1
59·34	1	56·81	1	18·25	1	67·18	3
60·16	1	59·10	1	18·59	2	68·11	1

2869.33	3	2927.96	1	2983.26	1	3034.76	2
70.17	1	28.34	1	84.10	4	36.10	1
73.12	1	32.73	1 +	85.20	3	36.94	1
73.60	1	33.14	1 +	85.48	1	38.09	2
79.26	1	34.47	1	86.00	2	38.64	1
81.98	1	35.22	2	86.65	2	38.84	1
82.25	1	36.11	3	87.76	1	39.78	3
85.30	1 +	37.30	1	89.40	2 Cp?	42.48	3
86.12	2	38.30	1	90.50	1	42.76	3
86.35	2	39.44	1	90.66	3	44.10	2
88.14	3	39.66	2	91.99	2	44.94	1
88.62	1	40.64	2	93.00	1 +	46.15	1
89.77	1	42.16	2	93.37	2	46.59	2
91.10	2	42.95	1	94.04	2	46.93	2
91.52	10	43.48	1	94.91	4	47.15	2
93.78	2	46.02	3	95.99	2	48.91	2
94.43	1 +	46.41	2	98.50	1	50.83	2
94.99	3 Cp	46.90	1	3000.59	2	52.62	1 +
97.05	1	47.25	1 +	02.15	1	53.83	1
99.85	3	49.35	2	02.70	2	54.17	2
2900.46	3 Cp	50.47	1	05.90	5	55.30	1
02.56	1	51.15	1	06.24	1	56.20	2
03.06	1	51.40	2	06.45	1	56.84	3 Cp
03.18	1	51.81	2 Cp?	09.01	1	58.52	1 +
05.55	1	53.15	1	09.50	3	61.26	1
07.00	1	55.44	2	10.75	3	62.19	1
07.30	1 +	57.75	2	12.14	1	63.26	2
08.25	1	59.76	2	13.82	2	63.80	2
08.46	2	60.96	1	14.55	3	64.13	1
09.32	2	61.90	1	14.79	3	65.01	1
09.61	2	62.64	3	15.42	4	65.17	4
10.50	1	63.45	4 Cp	17.21	2	66.56	1 +
11.53	8(Cp)	64.54	1	17.68	3	68.26	1 +
13.01	1	64.89	3	18.72	1	71.70	1 +
14.10	1	66.00	2	19.94	1	73.20	3
14.34	3	67.85	1	20.66	3(Fe)	73.61	2
14.60	1 +	69.96	2 Cp	22.55	1	73.79	1
15.00	1 +	70.70	5	23.83	1	73.95	1
15.40	3	70.90	1	25.96	2	74.64	1
16.61	2	74.40	1	26.20	2	75.35	1
18.39	2	75.69	1	26.80	3	76.15	2
19.49	4	77.66	1	28.20	1	77.74	5 Cp
21.25	3	78.55	2	28.84	1	79.37	1
22.21	1 +	79.03	1	29.35	1 +	80.26	1
22.96	1	79.60	1	30.26	1	81.26	2
24.36	2	79.81	1	31.26	15	81.60	3 Cp
25.76	2	80.00	1	32.75	1 +	84.48	1
26.02	1	82.61	2	33.96	1	85.93	1
26.86	5	82.75	1	34.22	1	87.11	2

3088.46	1	3145.16	3	3206.27	1	3272.74	1
88.91	1	45.62	3	10.26	1	75.91	2
89.21	4	46.24	3	10.70	2	76.92	4
89.72	1 +	47.99	1	14.75	1	79.09	3 Cp
93.21	1	49.09	1	15.59	1	81.88	4 Cp
93.54	1	50.16	1	16.23	1 +	83.52	5
93.99	3	51.14	5	17.30	3	84.80	1
95.01	2	53.28	2	18.45	3	85.77	3
95.34	1	53.99	3	21.30	1 + d	87.05	1
95.50	1	55.30	3	21.60	1 +	89.50	200
97.05	2	55.90	1	25.99	4	91.15	4
98.10	1	56.65	1	26.87	2	94.43	1
98.70	3	57.49	5	29.04	1	97.98	1
99.70	1	58.40	2	29.95	1	99.24	1
3101.45	2	62.40	2	30.71	1	99.56	1
02.18	2	63.90	3	31.66	3	99.92	1 +
02.97	2	65.00	1	32.14	3	3301.60	1 +
07.99	15	65.31	2	33.88	2	02.00	1 +
09.86	1	68.30	2	35.60	4	02.60	5
11.10	1 +	68.95	1	36.30	5	03.30	1
13.40	1	69.19	3	36.98	4	04.70	3
15.40	3	70.00	1	38.03	1 +	04.90	3
16.15	2	71.30	2	39.34	2	05.40	3
16.42	1	71.50	2 Cp	39.73	2	05.87	4
16.53	1	72.94	10	40.38	4	06.15	2
16.79	2	73.70	2	41.70	3	06.99	3 d
17.39	1	73.90	1	43.16	1	08.12	2
17.90	4	75.86	2	44.30	1 +	09.50	3
18.51	2 Cp	77.57	2	44.90	1	09.92	4
22.60	1	78.31	1	46.00	2	10.71	4
23.36	1	81.03	3	46.20	2	12.24	4 Cp
23.57	1	85.59	2	47.13	1	15.22	3
24.96	1	86.69	1	50.00	1	16.29	1
25.51	2	87.52	1	51.79	1	16.65	2
26.06	2	89.76	1	54.50	4 (Fe) Cp	17.00	3
27.25	1	90.94	1	54.90	1 +	18.41	1
27.93	2	93.01	8	58.15	5	18.80	1
29.20	1	94.36	2	58.73	1	19.15	2
31.37	10	94.88	2	59.21	3	19.37	3
32.69	1	95.45	2	60.92	1	19.60	3
33.99	8	95.71	1	61.63	4	20.48	1
34.40	1	96.20	1	61.80	3	23.40	2
36.23	1 +	96.46	1	64.21	3	24.34	2
36.85	3	96.66	1	64.90	1 Tm	24.64	1
38.50	1	98.24	3 Cp	66.75	4	25.29	1
41.01	4	98.79	3	67.52	3	25.98	1
41.85	3	3200.11	1	68.00	1	27.35	2
42.00	1	01.30	4	69.10	3	27.71	2
44.99	2	04.81	1	71.65	2	28.64	1 +

3329.62	2 d	3390.38	2	3437.79	2	3487.20	2
31.40	1	90.53	2	38.84	3	87.53	2
33.21	3	91.21	3 (Ni)	38.96	3	88.53	3
35.21	1 +	92.11	1 Tm	41.69	10	88.90	2
37.31	8	93.30	1	43.14	1	92.70	3
37.95	1	93.75	1	43.52	1 +	96.02	4 +
43.07	10	94.56	2	43.74	2	3500.04	1
46.64	3	95.29	1	44.80	1	06.23	1
47.69	3	96.49	1	45.83	1 +	07.51	5 d Cp
50.10	2	96.93	2 Cp	46.69	1	07.90	3 (Cy)
51.21	2	97.21	5 Cp	47.02	3	08.55	2 Cp
51.40	3	97.65	4 Tm	49.30	2 + br	13.16	1
52.25	1	98.16	3	49.90	2	15.98	3
52.61	3	98.80	2	50.78	1 +	18.25	3
53.40	1	3400.09	3	51.10	1	20.40	4
53.86	1	00.77	2	52.51	3	29.20	1
55.01	3	01.14	3	53.84	5 Tm	31.40	1
56.00	1	02.41	3	54.24	5	34.20	2
57.11	1	04.24	3	54.90	1	34.68	2
57.44	1	05.03	1 +	55.81	1 +	35.00	2
57.90	1 +	05.23	1 +	57.28	1	35.65	10
59.37	2	09.34	1	58.50	4	36.34	1 Tm
59.71	4 Cp	10.20	3	59.17	1	36.66	5
61.21	1	10.71	1	59.81	2	38.04	1 Tm
61.72	1	11.40	2	60.40	3	39.50	2
62.62	4	11.71	1	61.32	1	42.50	1 +
62.80	10	12.64	4	62.37	5 Tm	44.21	8
63.80	3	16.13	1	62.90	1.	45.05	4
65.21	2	16.73	3	64.47	20	45.91	3
66.14	2	17.04	2	67.20	2	48.62	3
67.12	1	17.17	2	67.65	2	49.05	3
68.49	2	18.57	4	69.23	1	49.94	3
68.79	1	19.75	2	69.39	1	52.45	2
69.75	2	20.50	2	70.05	1	54.59	5 Cp
74.64	4	21.80	1	70.85	1 +	57.94	2
75.62	5	21.91	1	71.20	1	59.15	2
76.69	5 Cp	23.86	1 +	72.60	5 Cp	60.49	10
77.65	1	25.27	10	74.26	1	60.85	10
78.05	1 +	25.77	5	74.66	1	64.06	3
78.65	2 + br	26.18	4	74.95	2	66.05	2
79.91	3	28.61	3	76.45	8	66.61	4
80.16	1	29.50	2	79.00	8	67.29	2
82.67	3	30.11	4	79.51	1	67.50	2
84.82	1	31.31	8	79.87	1	68.00	4 Cp
85.20	2	31.50	2	80.57	1	70.71	3
85.64	2 Cp	32.88	1	81.12	2	72.66	1 +
87.25	1	35.02	1	81.67	1	74.20	1 + Tm
87.62	4	35.51	2	81.89	2	77.17	2
89.10	1	36.59	3	85.90	3	85.61	8

3600:90	1 +	3770:24	8	4077:45	3	4376:65	1
04:00	1 +	73:60	1 +	86:86	1 +	86:61	4
06:63	4	74:49	1 Y?	89:83	4	92:50	1
08:93	5 Tm	82:71	2	91:67	1	93:90	3
09:66	1	83:70	1 + Tm	94:35	5 Tm	4402:46	1
10:37	1	87:30	1 +	98:06	1	09:50	2
11:46	2	91:90	3	4106:00	5 Tm	27:57	2 +
19:98	5	95:91	10 Tm	13:23	1	30:36	2
30:00	1 +	3807:72	2	19:65	2 +	39:36	10
34:70	2	10:90	2 Tm	21:88	2 +	81:48	5 Tm
37:91	4	16:39	2	23:02	1 +	82:60	3 +
38:54	1	17:57	2 Tm	24:90	1 Cp	87:39	1 +
43:80	2 Tm	36:65	2	35:29	5	94:18	1
47:95	2 (Fe)	38:32	4 Tm	38:45	1 Tm	4515:32	4
48:25	1	40:01	3	49:24	5	18:71	4 Cp
51:00	1 + (Cu)	43:10	1 +	70:30	3	22:72	4
53:77	2	48:15	15 Tm	74:75	2	53:75	2
65:95	1 Tm	72:97	3	81:00	10	64:17	3
68:22	3 Tm	83:24	5 Tm	84:43	3 Cp	76:40	10
69:85	4	87:48	4 Tm	87:79	5 Tm	82:53	5
70:83	2	90:65	1 Tm	90:49	3	89:38	2
75:22	4	96:75	1 Tm	4200:09	2 Tm	91:00	3
78:12	2	3900:97	4	03:90	4 Tm	98:50	2
79:03	2 Tm	04:93	3	06:20	1 +	4616:10	3 Tm
83:24	1 +	05:97	1	10:43	1 +	26:70	1 Tm
90:71	3	11:39	2	18:75	3	34:40	1 Tm
91:62	1	13:50	1	22:85	1 + Tm	44:70	2
94:35	100	16:59	3 Tm	28:15	1	50:21	2
98:76	2	29:70	2 Tm	32:19	1	57:21	1
99:67	1 +	34:40	1	34:72	1	58:19	1 Cp
3700:00	1 +	38:36	2	37:10	1	64:40	1 +
00:40	8 Tm	38:64	2	42:31	5 Tm	70:75	1
01:52	8 Tm	47:09	2	52:70	2	82:12	1 +
04:99	2 Tm	49:41	2 Tm	55:98	1	84:00	2
08:85	1 +	58:24	4 Tm	57:83	1	84:45	2
10:49	2 Y?	68:21	1	77:90	3	4718:80	2 +
18:04	10 Tm	80:10	1 +	4301:19	2	24:45	1 +
22:41	2	88:16	100	06:12	4	26:24	8
24:36	3	91:04	5	09:99	2	33:51	2 Tm
25:20	4 Tm	95:73	2 Tm	17:13	3	51:98	1 +
30:50	1 +	96:66	3 Tm	22:40	1	53:09	1 +
34:27	3 Tm	4000:98	1 +	26:60	1	82:07	8
34:81	2 +	07:50	1 +	36:7	1 + br	86:79	10
44:20	8 Tm	40:24	2	51:30	1 +	4816:60	2
49:82	2 +	43:20	1	53:10	2 +	18:52	1
51:95	5	44:66	1	60:09	5	20:41	3
57:00	2 Tm	47:55	1	63:86	1	31:39	1
61:49	10 Tm	52:43	2 +	68:10	1	37:11	2
62:08	8 Tm	56:35	2	70:97	1	37:64	1

4848·63	1 +	5147·23	1 +	5363·87	1 +	5771·90	1 +
51·31	2	96·29	1 +	78·00	1 +	5837·36	1
94·78	2	5211·75	1 +	90·09	1	5991·8	1 + br
95·15	1 +	40·69	1	5449·50	1	6052·88	1 +
4912·50	1 +	44·27	1	76·90	5 Cp	6222·10	2 Cp
35·69	10	57·64	1	82·15	1	47·20	1
37·38	1	65·72	1 +	5501·85	1 +	75·01	2
44·23	1	77·23	3	05·73	1	6332·50	1 +
67·06	3	79·69	2	39·23	2	46·20	1
94·35	1 + Cp	5301·13	1	56·67	20	96·60	1
5000·25	1 + br	07·29	3	88·69	1	6403·35	1
09·69	2	35·32	5	98·66	1	63·27	2 + (Cp)
34·40	1	45·87	1 +	5631·60	1	89·32	5
74·50	3	47·39	2	52·19	2	6668·10	1
76·92	1 +	53·11	5	76·06	1	6799·91	1
5135·30	1 + Cp	58·82	1	5720·25	3		

II. Ag. Silber.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 46 (1892.)

Material: Feinsilber aus der Kaiserl. Münze.

Verunreinigungen: Cu, Ni.

Linienzahl: 27.

2309·61	3	3130·1	1 + br	3766·50	1 +	4476·23	5
73·20	1 +	3280·84	500 u	3810·85	2 + br	4668·68	8
74·75	2 + br	3383·02	300 u	3981·78	1	4874·32	1 +
2437·83	1 +	3469·30	1 +	4055·42	50 u ¹⁾	5209·21	30
2721·85	2	3502·08	1 +	4212·15	10 + u ¹⁾	5465·68	50 +
2824·5	2 + br	3624·4	1 + br	4311·21	1	71·73	10
3099·21	1	82·45	2 + br	79·40	1		

III. Al. Aluminium.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 48 (1893)

J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot.)

Material: Metall von E. Merck.

Verunreinigungen: Ga, Mg, Mn, Pb, Sn, Ti.

Linienzahl: 28.

2263·57	3	2370·30	1	2568·08	20 u	3050·20	3
69·25	3 u	72·20	2 +	75·20	20 u	54·81	3
2321·65	1 +	73·23	5 u	75·56	5 +	57·27	4
67·13	5 u	73·60	1 +	2652·56	15 u	60·04	1
69·37	1	78·53	3 +	60·50	20 u	64·43	3

¹⁾ Rote Komponente stärker.

3066·28	3	3228·27	2	3944·20	800 u	6170·6	1 + br
82·30	500 u	36·94	1	61·71	1000 u	77·8	1 + br
92·89	800 u ¹⁾	42·85	1	6151·9	1 + br	93·5	1 + br

Kanten.

4470·73	K. R.	4648·42	K. R.	4866·55	K. R.	5377·6	K. R.
94·26	K. R.	72·21	K. R.	5079·53	K. R.	94·6	K. R.
4516·60	K. R.	94·80	K. R.	5102·37	K. R.	5410·0	K. R.
37·80	K. R.	4716·70	K. R.	23·60	K. R.		
57·80	K. R.	36·10	K. R.	43·15	K. R.		
76·60	K. R.	4842·40	K. R.	5357·9	K. R.		

IV. As. Arsen.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 52 (1894).

Material: Metall von E. Merck, mit Nickel legiert (40% As).

Verunreinigungen: Keine.

Linienzahl: 18.

2271·46	1 +	2370·85	2	2745·12	5	3032·95	4
88·18	4 u	81·26	2	80·37	10	75·46	2
2349·88	4 u	2437·30	1	2860·60	10	3119·70	3
63·13	1	56·60	3	98·86	5		
69·71	2	93·02	2	2991·10	3		

V. Au. Gold.

Ältere Messungen: H. Kayser und C. Runge, Wied. Ann. 46 (1892).

Material: Im Ultraviolett: Metall von C. Schuchardt, im Sichtbaren: Goldchlorid auf Gaskohle.

Verunreinigungen: Ag, Cd, Cu, Zn.

Linienzahl: 35.

2352·68	1	2883·56	1	4065·24	3	5064·79	2
87·80	1	2906·00	1	4242·00	1	5230·44	2
2428·00	5 u ²⁾	32·30	1	4315·32	2	5655·95	1 +
2590·15	1	3029·29	8	4437·46	1	5837·62	3
2641·60	2	3122·92	10	88·41	2	63·20	1 + br
76·02	15	3308·44	1 +	4606·68	1	5957·25	1 +
88·78	1	20·3	1 +	64·33	1 +	6278·40	4
2700·96	2	3909·49	1	4792·82	10	6332·48	1 +
48·36	4	4041·10	1	4811·81	3		

¹⁾ Als Verunreinigung als doppelte Linie gemessen auf 3092·88 i = 2, 3092·99 i = 1.

²⁾ Rote Komponente stärker.

VI. Ba. Baryum.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).

H. Lehmann, Ann. d. Phys. 8 (1902) (Ultrarot), V. Höller, Ztsch. für wiss. Phot. 6 (1908), J. M. Eder und E. Valenta, Wiener Akad. 119 II a. (1910) (Rot).

Material: Baryumbromid auf Gaskohle.

Verunreinigungen: Ca, Sr.

Linienzahl: 207.

2304·36	3 u	3586·69	2	4130·83	100	4673·75	3 +
35·38	3 u	88·32	3	32·58	5	91·85	8
47·65	1	90·15	1	66·17	10 r	4700·67	3 +
2596·87	1	93·50	1	79·58	1 +	24·96	1
2634·90	1	93·7	1 + br	4224·20	5 +	26·68	10
41·55	1	99·62	3	39·85	2 +	32·0	1 + br
47·42	2	3611·20	3 + r	42·80	4	39·5	1 + br
2702·70	2	30·85	10 + Ca?	64·45	2 +	4807·8	1 + br
39·38	2	37·2	2 + br	83·31	20 +	77·8	2 + br
71·46	1	40·56	3	91·33	5	4900·11	10
85·36	2	62·71	3	4323·05	3 + v	03·05	2
3071·72	20	64·82	1	25·34	3	34·26	100 u
3108·3	1 + br	75·45	1	32·97	3 +	47·50	2
84·5	1 + br	88·8	2 + br, r	50·60	15 +	95·90	1
3204·5	1 + br, r	3701·90	1	59·76	2	5055·14	2
23·0	2 + br, r	94·88	2 +	4402·80	20 +	94·1	1 +
53·2	1 +	3862·07	3 +	07·07	5 +	5160·10	5 +
63·0	2 + br, r	89·43	8	13·89	2 +	75·72	2 +
70·30	1 +	91·90	50	32·10	10	77·52	1 +
82·1	2 + br, r	92·90	10 r	67·50	3 +	5254·00	1 +
98·3	1 + br, r	3900·56	1 +	89·10	8 + br, v	65·80	1 Ca?
3315·92	1 +	06·15	1 +	93·79	6 + br, v	67·18	4 +
23·3	2 + br, r	10·03	50 r	4506·13	10	77·75	1 +
57·15	4 + r	17·38	2	23·48	10	79·6	1 + br
77·33	5 + br, r	35·91	50	25·19	10	91·05	1 +
3420·70	8 + br, r	38·03	8	54·21	1000 u	94·30	1 +
64·7	1 + br	45·3	1 + br	74·02	10	5303·00	2 +
3501·31	50	47·5	1 + br	79·82	15 +	05·92	1 +
25·30	20 r	75·6	1 + br	89·83	2 +	09·10	1 +
29·64	3	83·06	1	91·92	2 +	65·2	1 + br
31·8	2 + br	93·55	100	99·97	8 +	79·2	1 + br
45·00	20 + r	95·85	5	4605·10	1 +	81·2	1 + br
47·99	3 +	98·05	1 +	20·19	3	89·8	1 + br
62·19	2	4026·55	1 + r	28·45	3 +	5405·20	2 + br
66·83	2	81·1	1 + br	36·7	1 + br	24·85	50 r
76·24	2	85·0	1 + br	42·5	1 + br	37·56	2
77·81	3	87·6	1 + br	52·0	1 + br	73·90	2
79·91	20 r	4110·35	1	63·0	1 + br	5519·28	50

5535·70	100 u	5800·60	100	5985·4	1 + br	6483·21	50 u
46·3	2 + br	05·92	10	97·39	50	97·21	200 u
93·50	2 +	18·47	1 +	6019·70	50	99·10	100 u
5618·9	1 + br	19·19	3	63·44	50 u	6527·60	50 u
19·25	1 + br	26·56	100	83·67	5	81·00	1 +
20·2	1 + br	49·50	1 +	86 6	1 + br	95·65	20 u
20 6	1 + br	53·91	200 u	6111·10	100 u	6654·27	1 +
41·3	1 + br	59·51	1 +	29·50	2	75·50	10
80·45	5	5907·81	10	41·95	1000 u	94·08	10
5709·89	1 +	27·9	1 + br	6235·5	2 + br	6865·92	3
13·80	2 +	62·7	2 + br	6323·6	1 +	68·15	1 +
21·0	1 +	65·00	3 +	41·93	50	7060·19	3 u
78·00	500	72·00	50	6411·95	1 +	7120·58	1 +
84·29	3	78·69	2	51·11	30		

VII. Be. Beryllium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall, Astroph. J. I (1895). J. M. Eder und E. Valenta Wiener Akad. 119 II a (1910) (Rot).

Material: Berylliumnitrat aus Oxid von L. F. Nilson, auf Gaskohle.

Verunreinigungen: Keine.

Linienzahl: 9.

2348·64	3 u	2650·71	10	3131·17	20	3321·50	20
50·90	1 +	3130·53	20	3321·23	20	4572·88	8
2494·76	8 u						

Kanten.

4708·89	K. R.
32·85	K. R.

VIII. Bi. Wismuth.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1893).

W. Schwetz, Ztsch. für wiss. Phot. 8 (1910). J. M. Eder und E. Valenta,

Wiener Akad. 119 II a (1910) (Rot).

Material: Metall von C. Schuchardt.

Verunreinigungen: Pb, Sn, Tl.

Linienzahl: 48.

55	1 + (Cu)	2809·78	20 +	3405·47	3	4493·19	2
98	8	63·90	3 u	3510·97	30	4615·29	1
18	1 +	98·12	50 u	96·34	50	15·70	1
72	2	2938·43	50 r, u	3888·07	3	4692·50	1 +
60	4	89·12	30	88·34	3	4722·61	20
00	10	93·41	30	4121·86	20 +	22·83	2
76	4	3024·76	30	22·10	20 +	34·0	2 + br
91	4	35·02	10 +	4220·65	1 +	5209·5	1 + br
55	3	67·84	500 u	54·46	2	97·8	1 + br
39	3	76·79	10	4308·40	3	5552·52	4 + r
55	20 r	3397·43	30 u	08·75	5	5742·75	1 + br
80	2 +	3405·32	3	4492·80	2	6135·2	1 + br

IX. Bo. Bor.

e Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).

A. Rowland und R. R. Tatnall, Astroph. J. 1 (1895).

ial: Borsäure von E. Merck, auf Gaskohle.

reinigungen: Keine.

nzahl: 2.

2496·84	20 u
97·80	20 u

Kanten.

2265—2300 Bande nach Rot, ohne angebbare Kanten.

45	K. R.	2437·20	K. R.	2551·50	K. R.	2675·37	K. R.
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X. Br. Brom.

e Messungen: Fehlen.

ial: Bromkalium auf Gaskohle.

nzahl: 0.

XI. C. Kohlenstoff.

e Messungen: J. M. Eder und E. Valenta, Wiener Akad. 119. IIa (910) (Rot).

ial: Gaskohle.

reinigungen: Al, Ba, Bo, Ca, Cu, Fe, Mg, Mn, Si, Ti, Va.

nzahl: 1.

2478·66	3
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Kanten.

3584·03	K. V.	4158·18	K. V.	4519·05	K. V.	4697·59	K. V.
85·97	K. V.	67·79	K. V.	32·03	K. V.	4715·20	K. V.
90·49	K. V.	81·00	K. V.	53·30	K. V.	37·02	K. V.
3861·70	K. V.	97·23	K. V.	78·16	K. V.	5129·30	K. ?
61·86	K. V.	4216·13	K. V.	4606·28	K. V.	65·30	K. V.
71·51	K. V.	4502·28	K. ?	85·00	K. ?	5635·4	K. V.
83·50	K. V.						

XII. Ca. Calcium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1891).

H. Lehmann, Ann. d. Phys. 8 (1902) (Ultrarot). C. F. Meisenbach,

Ztsch. f. wiss. Phot. 6 (1908). F. L. Cooper, Astroph. J. 29 (1909).

J. M. Eder und E. Valenta, Wiener Akad. 119 II a (1910) (Rot).

Material: Im Ultraviolett: Calciumnitrat auf Gaskohle, im Sichtbaren:

Calciumchlorid auf Gaskohle.

Verunreinigungen: Ba, Na, Sr.

Linienzahl: 114.

2398·66	1 u	3706·18	10	4496·3	1 + br	5270·44	30
2995·06	3	37·06	20	4509·8	1 + br	5349·69	20
97·41	3	3933·81	500 u	12·7	1 + br	5513·16	8 +
99·74	2	49·10	8	27·35	20 + r	82·20	10
3000·96	2	57·22	10	78·88	20	88·94	20
06·97	4	68·63	300 u	81·77	30	90·30	8
09·30	3	73·91	10	86·22	30	94·70	20
3159·01	10	4093·00	4 +	4624·63	1 +	98·69	20
79·50	15	95·30	6 + d	85·35	5 +	5601·50	10
81·43	3	98·9	6 +	4722·48	1	03·09	10
3215·0	1 + br	99·2	2 +	37·00	1 +	5718·56	1 +
25·6	1 + br	4226·90	1000 u	42·10	1	43·55	1 +
69·37	1 +	40·61	3 +	84·50	1	5857·69	10
74·95	1 +	83·20	50	4807·8	1 + br	67·89	1
86·35	1 +	89·50	50	23·2	1 + br	6006·31	1
3344·52	2 +	99·18	30	34·1	1 + br	6102·92	10
50·25	5 +	4302·70	100	47·38	2 + br	22·49	15
61·95	10 +	07·90	30	78·38	20	61·57	3
3468·70	1 +	18·80	50	4981·94	1	62·41	10
75·01	2 +	55·50	3 + r	5041·83	20	64·05	2
87·82	4 +	4425·60	100	5189·00	100	66·70	3
3624·19	10 +	35·17	100 u	5260·58	5	69·30	3
30·87	20 +	35·88	50	61·87	10	69·82	4
31·07	8 +	55·00	200 u	62·40	10	6406·0	1 +
44·53	20 +	56·10	20	64·41	15	17·90	1 +
44·90	8 +	56·84	8	65·73	20	39·35	50

6449·3	1 + br	6462·80	30	6494·02	20	6573·00	2
50·01	15	64·95	1	99·84	8	6717·90	4
55·83	4	71·90	10				

Kanten.

5934·2	K. V.	5949·4	K. V.	6181·5	K. V.	6206·5	K. V.
35·6	K. V.	51·6	K. V.	82·2	K. V.	06·9	K. V.
36·8	K. V.	54·0	K. V.	83·0	K. V.	07·5	K. V.
38·3	K. V.	56·5	K. V.	83·9	K. V.	08·1	K. V.
39·8	K. V.	59·3	K. V.	84·9	K. V.	08·9	K. V.
41·5	K. V.	62·1	K. V.	91·8	K. V.	09·7	K. V.
43·3	K. V.	83·3	K. R.	92·7	K. V.	10·6	K. V.
45·2	K. V.	6181·0	K. V.	93·5	K. V.	11·7	K. V.
47·2	K. V.						

XIII. Cd. Cadmium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1891).

Material: Metall von E. Merck.

Verunreinigungen: Pb, Tl.

Linienzahl: 38.

2240·0	1 +	2764·2	3 + br, r	3252·86	20 r	4307·2	2 + r
65·10	2 + u	75·20	2 + br, r	61·23	20 u	4413·21	3
67·55	2 +	2837·05	10 +	3403·86	100 u	15·86	1
2306·71	2 +	68·40	2 + r	66·37	100 u	4662·8	5 + r
13·1	1 +	80·89	10 + r	67·81	50 u	78·38	50 +
29·36	3 +	81·35	8 + r	3500·20	2	4800·14	100 u
2573·2	1 +	2961·4	1 + br	3610·72	500 u	5086·10	100 u
2639·6	1 + br	80·80	30 + br	13·11	50 u	5155·0	1 + br
77·8	2 + br	3081·11	10 r	14·62	10	6438·70	200
2748·75	1 +	3133·47	20 r				

XIV. Ce. Cer.

Ältere Messungen: A. Bakowski, Ztsch. für wiss. Phot. 6 (1908).

F. L. Cooper, Astroph. J. 29 (1909). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot).

Material: Ceronitrat von L. Haitinger, auf Gaskohle.

Verunreinigungen: Pr (Spuren).

Linienzahl: 2894.

2651.13	1	3130.99	2	3221.33	3	3286.50	1
52.57	1	32.73	1	22.55	1	87.54	1
60.47	1	33.46	1	23.53	1	88.29	1
2831.05	1	36.84	1	24.06	1	88.89	1
54.76	1	37.73	1	25.83	1	90.50	1
54.99	1	42.40	1	26.17	1	90.73	1
74.26	1	44.71	1	27.25	3	93.75	1
2908.55	1	45.39	2	29.25	1	95.09	1
56.06	1	46.52	2	29.49	2	95.45	2
64.93	1	48.59	1	31.39	2	96.34	1
72.82	1	49.52	1	32.43	1	97.04	1
74.70	1 +	51.27	1	33.56	1	98.48	1
77.03	1	54.62	1	34.31	3	3300.15	1
77.57	1 +	55.89	2	35.04	2 r	00.30	1
91.01	1	64.30	2	35.80	1	03.37	1
95.77	1	66.40	1	36.87	3	04.98	2
3002.25	1	66.74	1	42.28	1	06.77	1
02.87	1	67.41	1	43.50	3	07.36	1
03.66	1	69.32	2	45.31	1	08.16	2
08.89	2	71.76	2	45.68	1	09.40	1
17.29	1	72.46	1	46.82	2	11.03	1
17.67	2 (Cr)	76.93	1	49.30	1	11.63	1
21.68	2 Cr?	77.26	1	49.56	1	12.35	1
37.85	1	78.89	1	52.65	2	13.44	1
52.08	1	81.00	1	54.18	2	14.17	1
55.35	2	83.65	2	56.81	1	14.86	2
56.87	2	84.35	1	59.02	1	15.24	1
63.12	3	86.24	2	59.97	1	17.94	1
68.78	1 +	87.79	1	61.12	1	19.10	1
69.78	1	88.92	2	63.55	1	20.60	1
71.25	1	89.75	1	64.04	1	21.09	1
71.74	1	90.50	2	65.60	1	23.46	1
73.03	1	94.95	3	70.28	1	25.50	1
77.47	1 +	96.06	1	71.29	1	26.23	1
79.75	1	99.41	1	71.67	1	27.40	1
80.05	1	3201.25	1	72.13	1	27.81	1
83.79	1	01.85	3	72.39	3	28.07	1 d
84.57	1	03.05	1	72.85	1	29.15	1
90.51	1	06.07	1	75.00	2	30.64	1
91.44	1	06.60	1	76.36	1	31.39	1
96.64	1	07.03	1	79.14	1	31.95	1
97.05	1	07.74	1	79.99	2	32.37	1
3103.50	2	11.08	1	80.65	1	32.63	1
07.58	1	12.63	1	81.23	1	33.20	1
09.07	1	12.71	1	83.50	1	33.82	1
10.40	1	16.81	1	83.84	1	34.05	1
11.32	1	18.50	2	84.36	1	34.43	1
27.62	1	19.06	3	85.35	2	34.60	2
30.45	1	21.04	1	86.16	1	36.50	1

3336·68	1	3387·93	1	3542·52	2	3488·67	1
39·66	1	89·80	1	43·09	1	90·29	1
39·95	1	90·67	1	43·65	1	91·81	1
41·05	1	91·76	1	46·35	1	92·65	1
42·04	2	93·75	1	46·85	1	93·25	1
44·00	2	94·08	1	48·41	1	93·86	1
44·91	3	94·29	1	51·76	1	94·80	1
45·56	1	95·20	1	53·39	1 +	95·16	1
46·65	1	95·57	1	54·60	1	95·62	1
48·30	1	96·89	1	54·96	1	96·08	1
50·11	1	98·86	1	56·84	1	96·48	1
50·86	1	99·12	1	56·92	1	97·49	1
51·32	1	3400·41	1	60·00	1	98·76	1
51·68	1	03·75	1	60·30	1	98·85	1
52·45	1	04·27	1	61·51	1	3500·16	1
53·12	2	05·05	1	61·93	1	00·84	1
53·47	1	05·96	1	63·36	1	01·61	2
54·11	1	06·11	2	63·90	1	01·75	2
54·67	1	06·35	2	64·32	2	01·97	1
55·16	2	08·55	1 +	64·99	1	02·80	1
56·55	2	12·45	1 +	65·10	1	03·06	1
57·35	2	15·75	1	66·02	1	03·20	1
58·60	1 +	16·70	1	67·10	1	06·40	1
59·49	1 +	16·82	1	67·93	1	06·90	1
59·60	1 +	16·99	1	68·26	1	07·49	1
60·70	2	17·55	2	69·07	1	08·11	2
61·95	2	17·99	1	69·15	1	08·62	1
64·19	1	19·05	1	69·55	1	08·86	1
64·50	1	20·32	1	70·30	1	09·40	1
64·98	1	22·62	1 +	70·56	1	09·89	1
66·00	1	22·85	3	72·17	1	10·10	1
66·71	2	23·99	1	74·37	1	10·39	1
68·55	1	25·47	1	74·94	1	10·85	1
68·88	1	26·09	1	75·80	1	11·76	1
68·94	1	26·34	3	76·49	1	15·80	1
69·36	1	26·71	1	76·99	2	15·92	1
71·35	2	28·85	1	77·56	1	17·52	3
73·65	2	30·00	1	78·12	1	18·17	1
73·92	2	30·45	1	79·15	1	18·55	1
74·32	1	31·00	1	79·75	1	19·20	2
75·27	1	31·65	1	80·46	1	19·86	1
75·95	1	33·25	2	80·52	1	20·67	2
77·28	2	33·80	1	81·16	1	21·14	1
79·33	1	35·35	1	81·33	1	22·04	2
81·66	1	36·43	1	82·27	1	23·35	1
83·56	1	37·46	1	82·53	2	24·18	1
83·85	2	37·96	1	84·89	1	26·82	2
84·11	1	39·96	1	85·20	3	27·75	1
85·50	1	41·36	2	86·98	1	27·98	1

3528.17	1	3569.45	1	3630.30	1	3673.79	2
28.76	1	69.98	1	30.56	1	74.23	1
29.16	1	71.14	1	31.35	2	76.27	1
30.16	2	72.56	1	32.25	1	79.26	1
30.75	1	73.85	1	33.53	1	79.55	1
31.07	1	76.35	2	36.20	1	80.05	1
31.75	1	77.59	3	37.65	1 d	80.20	1
32.75	1	80.73	1	37.88	1	80.28	1
33.03	1	80.95	1	38.14	1	81.01	1
33.76	1 d	83.78	1 +	38.40	1	81.54	1
34.20	3	84.50	1	39.68	1	82.24	1
34.57	1	86.93	1	40.84	1	87.95	1
35.71	1	87.38	1	41.67	1	88.80	1
36.65	1	87.79	2	42.75	1	89.30	1
36.86	1	88.28	1	42.95	1	93.59	1
37.31	1	88.59	2	43.58	1	93.85	1
37.60	1	90.78	2	44.45	1	95.05	2
38.94	1	93.33	1	45.35	1	96.09	1
39.24	3	94.22	1	45.59	1	96.23	1 +
40.98	1	96.26	1	46.79	2	97.80	1
41.83	1	96.88	1	47.10	2	98.26	1
42.07	1	97.39	1	47.68	1	98.50	1
43.45	1	98.35	2	47.91	2	98.79	1
43.68	1	3600.14	1	49.85	1	3700.06	1
45.75	2	00.74	2	50.28	1	02.95	1
45.98	2 d	01.94	1	51.05	2	05.15	2
46.34	2	04.34	2	52.25	1 +	07.09	1
46.80	1	06.28	1	52.43	1 +	07.54	1
47.15	2	07.77	2	53.25	2	07.78	1
47.96	1	08.00	1	53.80	2	09.46	4
48.30	1	09.85	3	55.05	2	10.09	4
48.98	1	11.06	2	55.96	3	10.84	1
51.61	1	11.50	2	59.37	2	14.12	1
51.86	2	11.87	1	60.10	1	14.93	1
52.25	1	12.55	1 + d	60.18	1	15.28	1
52.88	2	13.86	2	60.78	2	15.60	1
54.80	1	15.79	1	61.85	1	16.51	3
55.95	1	16.35	1	61.96	1	17.06	1
56.50	1	19.52	1	63.10	1	17.63	1
57.36	1	20.10	1	63.83	1	18.33	2
58.87	1	21.30	1	64.86	1	18.51	3
59.47	1	22.30	2	65.14	1	22.26	1
61.00	4	22.56	1	66.15	1	22.45	1
61.70	1	23.97	3	67.90	1	22.90	1 +
62.25	1	24.29	1	68.10	3	23.80	1
63.96	1	25.51	1	68.85	1	24.79	1
66.20	1	28.40	1	72.07	1	25.82	2
68.25	1	28.75	1	72.30	1	27.11	2
68.49	1	29.93	1	72.93	2	28.20	2 +

3728·57	3	3776·76	2	3829·50	2	3886·13	1
29·16	1	77·22	1	29·80	2	87·20	1
30·06	1	77·80	1	30·13	2	88·51	1
30·50	1	79·75	1	31·22	2	89·13	1
32·05	1	81·25	1	32·41	1	89·44	1
32·73	2 +	81·78	3	32·86	1	89·64	1
33·70	1	82·66	3	34·35	2	90·16	4
39·85	1 +	83·16	1	34·66	2	90·65	1
40·27	1 +	83·69	2	34·90	1	90·90	1
41·16	1 +	86·77	4	35·87	1	91·15	2
41·53	1 +	87·30	1 +	36·22	2	91·94	1
41·87	1 +	87·66	1 +	37·33	1	93·40	1
44·17	1 +	88·30	1	38·40	3	94·02	1
46·51	2	88·60	1 +	38·69	3	94·47	1
48·19	2	88·90	3	43·88	1	95·29	3
50·25	1	90·99	1 +	48·70	3	95·60	1
51·18	2	91·84	1	49·67	1	96·98	3
51·62	2	92·46	2	52·25	1	97·57	1
52·52	1	92·73	1	52·55	2	98·43	3
52·58	1	93·65	1	53·30	3	98·84	1
53·03	1	93·99	1 +	54·30	3	99·11	2
53·93	1	94·84	1	54·42	3	99·64	1
55·59	2	95·40	2	55·41	3	3900·35	1
55·89	2	96·30	1	56·48	1	01·45	1
56·44	1	96·81	1	56·77	1	01·80	1 +
57·38	1	97·06	1	57·11	2	03·50	2
58·00	1	99·21	1	57·35	1	04·08	1
59·30	1 +	3800·48	2	57·74	2	04·33	1
59·89	1	01·69	5	57·98	1 +	04·51	2
60·54	1	02·92	1	60·53	1	04·74	1
60·85	1	03·22	3	60·85	1	05·45	1
63·12	2	07·81	1	62·57	2	07·10	2
63·75	1	08·25	3	66·93	1	07·45	2
64·25	3	09·34	2	68·24	2	07·56	2 +
65·17	2	09·61	1	68·61	2 +	08·25	1
66·02	1	11·05	1	71·00	1	08·55	2
66·18	1	12·35	2	74·82	2	08·66	2
66·65	1	15·08	1 d	75·16	2	09·17	1
68·12	1 +	15·92	2	76·25	1	09·45	2
68·40	1 +	17·56	2	77·10	3	09·90	1
68·90	2	18·82	1	78·49	3	10·09	1
69·19	1	19·15	1	81·80	1	10·85	1
70·08	1	21·00	2 +	82·04	1	11·46	1
70·93	2	21·40	2	82·60	2	12·35	1
71·75	2	21·86	2	83·70	1 +	12·60	3
72·80	1	24·05	2	84·11	1	14·15	1
73·37	1	24·55	1	84·35	1	15·10	1
73·60	1	25·36	1	85·36	1	15·68	2
76·23	1 +	27·30	1	85·87	1	16·30	2

3916·81	1	3952·77	8	3990·86	1	4030·54	2
17·05	1	53·80	2	91·48	1	31·51	4
17·40	1	54·10	2	92·30	1	33·95	1
17·78	1	55·51	2	92·55	3	37·53	1
18·42	3	56·07	1	93·06	2	37·81	2
19·95	3	56·17	1	93·33	1	38·40	2
21·91	3	56·45	3	94·00	3	40·04	1
23·29	3	57·05	2	94·75	1	40·92	6
24·81	2	57·33	1	95·59	1	41·43	1
24·95	1 +	58·11	1	96·63	1	42·29	1
27·15	1	58·41	2	97·63	1	42·73	5
27·55	1	59·02	2	97·89	1	43·60	1
27·72	1 +	59·76	2	99·42	5	45·40	3
28·78	1 Cr?	59·98	2	4000·89	1 d	46·49	3
28·88	1	60·55	1	01·23	1	47·41	2
29·27	1	61·09	3	01·72	2	48·50	1
30·14	1	62·25	1	01·91	2	49·16	1
30·95	1	63·55	1	03·00	1	49·95	1
31·24	3	64·35	1	03·13	1	51·00	1
31·53	2	64·65	2	03·36	1	51·56	2
31·98	2	67·21	2	03·93	3	52·15	2
32·29	2	67·31	2	04·75	1	53·66	3
33·13	1	67·70	1 +	05·80	3	55·12	3 r
34·89	1	70·20	1	07·74	2	55·96	1
35·37	1	70·61	1	08·82	1	57·05	1
36·05	1	70·81	1	09·24	1	58·40	1
37·27	1	71·84	2	10·30	1	58·90	1
37·76	1	72·25	2	11·73	1	60·36	1 +
37·95	1	73·23	1	12·34	1	60·64	1
38·20	3	74·15	1	12·57	5	60·88	1 +
39·66	1	74·38	1	15·07	3	61·56	1
39·76	1	75·24	1	16·02	2	61·45	1
40·47	3	76·82	1 Cr?	18·75	1	62·39	2
40·75	1	76·88	1	19·20	1	63·10	2
41·09	2	77·67	1	19·44	1	64·10	1
42·31	5	77·94	1	19·60	1	65·06	1
42·86	3	78·80	3	20·05	1	65·32	1
43·26	1	80·10	1	20·70	1	66·69	1
43·60	1 +	81·08	2	22·44	2	67·06	1
44·06	3	82·06	1	23·54	1	67·44	2
45·02	1	82·35	1	24·65	4	68·63	2
46·83	1	83·07	2	25·31	2	69·00	3
48·09	2	83·45	2	26·05	1	70·27	1
49·52	2	84·84	3	27·20	1 +	71·01	1
49·94	1	86·30	1	27·82	1	71·27	1
50·57	1	86·56	1	28·57	4	71·96	3 (Fe)
50·96	1	89·59	2	29·44	1 +	73·10	2
51·76	1	90·27	2	29·90	1	73·65	3
52·35	1	90·60	1	30·37	1 +	73·96	2

81	1	4108.89	1	4145.16	4	4182.43	1 +
87	3	09.71	1	46.39	3	83.37	1
05	3	10.54	3	48.34	1	85.50	3
41	2	11.02	2	49.05	2	86.78	10
02	1	11.56	3	50.11	10	87.48	3
61	2	12.10	1 +	51.10	3	88.55	1
48	2	13.89	2	52.17	4	89.35	1
70	3 +	14.30	1 +	53.13	1 +	89.80	1
18	1	15.07	1 +	53.31	2	90.83	2
46	1	15.51	3	54.11	1	91.24	1
85	2	17.14	2	55.42	1	91.56	1 +
60	2 +	17.44	2	55.71	2	92.95	1
70	2 +	17.73	2	56.15	1 +	93.25	4
40	4	18.30	4	57.75	1 +	93.45	3
40	3	19.16	8 d?	58.25	1 +	94.04	3
68	1 +	19.99	3	59.20	3	95.05	2
80	1	21.00	3	60.32	2	95.99	1
41	3	21.75	1	61.34	2	96.49	4
56	2	23.40	2	62.00	1	96.71	1 +
50	2	23.68	2	62.13	1	97.24	1 +
73	1	24.03	4	62.46	1	97.69	2
73	1	24.98	3	62.80	2	97.82	2
02	2	25.60	1	63.05	1 +	98.15	2
11	1 +	25.90	1	63.70	3	98.57	1
03	1	26.80	1	64.16	1	98.84	5
09	1	27.52	4	64.45	1 +	4201.41	3
56	2	27.90	2	64.71	1 +	03.10	5
15	2	28.21	2	64.96	1 +	03.66	1
02	1	28.43	2	65.29	1 +	04.93	1
26	1	29.30	2	65.78	5	05.33	1
09	1	30.88	3	66.00	1	06.00	1
47	1	31.27	3	66.38	1	06.07	1
4	2	32.50	1	66.84	2	07.00	1 +
01	1 +	32.70	1	67.06	3	08.57	1
01	1 +	33.98	8	67.98	2	09.56	2
08	1 +	35.59	3	70.02	5	10.17	1
00	1	36.04	1	71.24	1	13.23	1
5	2	37.05	1 +	71.59	1	14.20	3
1	1	37.63	2 +	71.94	1 +	17.40	1 +
6	1 +	37.81	4	72.30	1	17.74	3
3	3	38.25	2	74.64	2	19.87	1
4	1	38.51	2	75.40	1	20.95	1
0	1	39.60	1	76.15	1	21.35	1
6	2	39.98	1	76.25	1	22.78	10
0	1	40.66	1	76.87	2	24.05	1
5	2	40.94	1 +	78.32	1 +	24.80	1
9	3	42.57	3	79.27	1	25.90	1
6	1	42.99	2	79.46	1	27.90	3
0	1	44.67	3	81.28	2	28.45	1

4230.30	1	4270.34	4	4315.11	1	4349.55	1
30.70	1	70.89	3	15.54	2	49.95	6
31.91	2	71.91	3	15.81	1	50.70	1
32.24	2	73.60	3	16.13	1 +	51.25	1
32.74	2	75.66	4	16.55	1 +	52.89	4
33.37	1	76.48	1	17.47	2	53.60	2
34.37	2	77.83	1	18.13	2	54.05	1
34.89	1	78.39	2	19.21	1	54.62	1
36.52	1	79.01	3	19.80	1	55.05	1
37.30	1	80.30	3	20.89	4	55.60	1
37.98	1 +	81.17	2	21.42	1	56.94	1
40.09	8	81.29	2	21.70	1	57.15	1 +
40.75	1 +	82.08	1	22.29	1	58.08	1
41.57	1 +	83.16	2	22.96	1	59.25	2
42.16	1	83.70	1	24.25	1	59.79	1
42.43	1 +	84.24	1 +	24.79	1	60.35	2
42.89	4	85.52	4	24.97	2	60.64	2
43.94	1	86.65	1	26.65	1	61.54	1
44.70	1 +	87.10	1 +	26.98	2	61.84	2
45.10	1	87.76	1	27.95	1	62.60	1
46.08	5	88.80	3	29.00	1	63.26	1
46.55	1	90.07	4	30.10	1	63.60	1
46.87	3	90.77	1	30.60	4	64.31	1
48.24	1	91.08	1	31.12	1	64.82	8
48.79	8	92.77	2	31.93	3	65.53	1 +
51.75	1	92.95	2	32.10	1 +	65.72	1 +
52.02	1	93.29	1	32.86	4	67.15	2
53.50	3	94.95	2	33.55	1	67.48	1
54.85	1 +	96.23	3	34.43	1 +	67.73	2
55.06	1 +	96.52	1	35.01	2	68.40	2
55.51	1	96.88	10	35.61	2	69.06	1
55.91	3	99.52	3	36.41	4	69.41	2
56.30	3	4300.50	5	37.96	10	70.84	1
57.26	2	01.00	2	39.50	5	71.45	2
58.50	1	01.68	1	39.84	1	71.75	1
58.85	1	03.70	1 +	40.70	2	72.03	1 +
59.20	1	04.44	2	42.30	2	72.58	2
59.89	2	04.88	2	42.63	2	72.85	1 +
61.31	2	05.29	3	43.70	1	73.41	2
62.95	1	06.89	5	44.01	1	74.00	5
63.60	3	09.89	5	44.44	1	75.34	2
64.12	2	10.55	1	44.64	2	76.09	8
64.52	2	10.85	3	45.06	1	77.02	1
64.83	1	11.74	3	45.60	1	78.71	1
65.85	1	12.72	1	46.08	3	78.96	1
66.1	1 + br	13.02	1	46.57	2 +	79.25	1
67.36	2	13.26	2	47.80	2	80.25	3
68.45	2	13.75	1	48.35	1	80.50	1
69.40	3	14.64	1	48.72	1	80.89	1

4381.27	1	4413.36	2	4460.40	10	4498.02	3
81.96	2	13.96	2	61.31	5	99.41	1
82.32	10	17.05	3	62.19	1	99.70	1
84.60	1	18.12	1 +	62.46	1	99.95	1
85.17	1	18.50	1	63.59	5	4500.52	2
85.48	1	18.92	8	64.05	1	01.26	1
85.65	1 +	19.45	2	64.35	2	01.89	1
86.53	2	20.05	1	64.86	3	01.98	1
86.95	10	20.57	1	65.60	1	02.76	1
87.22	1	21.30	1	67.25	1	04.01	1
87.67	1	21.50	1 +	67.50	1	04.24	1
88.16	3	22.28	1	67.71	4	05.29	1
89.28	1	23.60	2	68.20	1	05.76	1
90.00	1	23.83	3	69.35	1 +	06.05	1
90.45	3	24.48	1	70.05	1	06.59	2
90.75	1	27.25	4	70.74	1	06.80	1 +
91.00	1	28.10	4	71.41	8	07.20	1 +
91.49	1	28.50	4	71.82	1	07.95	1
91.83	8	29.43	8	72.27	1	08.26	2
92.60	1	30.18	2	72.87	4	08.90	1
92.86	1	32.51	1	73.84	1	09.34	2
93.37	3	32.90	2	74.89	2	11.09	1
93.72	1	33.12	2	75.50	1	11.81	2
94.48	1	33.90	2	77.38	1	14.24	1
94.95	3	36.38	1	77.78	1	14.62	1
95.90	1	37.78	2	78.15	1	16.01	2
96.22	1	39.40	2	79.52	10	16.45	1
96.34	1	39.66	1	80.15	1	17.26	1
96.76	2	40.29	1	82.09	1	18.16	1
97.43	1	41.05	3	83.00	1	18.44	1
98.05	1	41.79	1	83.54	1	19.74	2
98.95	3	42.59	1	84.06	4	20.57	1
99.39	4	43.91	3	84.98	3	21.3	1 + br
99.67	1	44.52	5	85.68	2	22.15	1
4400.31	1	44.88	8	86.59	1	22.26	1
00.70	2	46.30	2	87.06	10	22.70	1 +
01.03	2	47.81	1	88.06	1	23.25	8
01.67	1	49.49	8	88.95	1	24.17	1
02.15	1	49.77	2	89.68	1	24.75	1
03.24	1	50.92	8	90.65	1	25.02	1
03.47	1	51.75	1 +	91.50	1 +	26.60	1 +
03.73	1	52.72	2	92.53	1	27.51	10
05.65	2	53.33	2	93.15	1	28.12	1
07.45	3	55.10	2	93.42	1	28.64	10
09.02	2 (Pr)	55.83	2	93.63	1	29.41	1
09.46	1	56.05	1	94.41	3	30.06	1
10.84	8 d	56.71	1	95.55	3	30.98	1 +
11.85	1	57.96	1	96.41	3	31.45	1
12.20	2	58.75	1	97.80	1 +	31.79	1

4532-18	1	4563-53	1	4604-39	1	4657-21	1	+
32-64	2	64-03	1	05-06	1	57-40	1	
33-38	1	64-94	1	05-65	1	58-03	1	
34-36	1	65-42	2	06-59	4	58-21	1	+
34-92	1	66-02	4	08-65	2	58-55	1	
35-30	1	67-30	1	08-92	1	59-59	2	
35-50	1	67-56	1	10-63	1	60-13	1	
36-33	1	68-75	1	11-73	2	61-82	1	
36-79	1	69-30	1	12-15	1	63-40	2	
37-06	2	69-83	2	13-20	2	64-29	1	
38-06	2	70-26	1	14-40	1	65-46	1	
38-60	1	70-81	1	15-39	2	66-88	1	
39-23	2	71-65	1	18-25	1	67-52	1	
39-90	10	72-45	10	18-80	1	68-96	1	
40-81	1	72-95	2	19-13	1	69-69	2	
41-75	1	74-28	1	20-22	1	70-30	1	
41-93	1	75-21	1	20-75	1	70-94	2	
42-24	1	75-94	1	21-9	1	71-10	1	
43-09	1	76-62	2	23-65	1	71-60	1	
43-82	1	76-96	1	24-40	1	71-89	1	
45-12	3	78-28	1	24-53	1	72-43	1	
45-60	1	78-94	2	25-08	3	73-5	1	hr
46-08	1	79-41	2	26-65	1	74-67	1	
46-21	2	80-19	1	28-33	10	75-08	1	
47-00	1	81-25	1	30-97	1	75-48	1	
49-05	2	82-67	5	32-48	3	76-5	1	hr
49-80	2	83-25	1	33-76	1	78-21	1	
50-49	2	84-31	1	36-90	1	78-79	1	
50-72	1	86-10	1	38-93	1	79-59	1	
51-49	3	88-56	2	40-35	1	80-30	3	
52-25	1	89-32	1	40-65	1	80-65	1	
53-26	1	89-55	1	41-05	1	81-19	2	
53-60	1	90-36	1	41-24	1	82-09	1	+
54-72	1	91-29	2	42-46	1	83-21	1	
55-60	2	91-62	1	43-31	1	84-79	4	
55-78	1	93-06	1	43-95	1	85-39	12	
57-20	1	93-29	1	44-40	2	86-14	12	
57-57	1	94-11	10	47-42	1	87-79	1	
58-20	1	96-27	1	47-54	1	88-40	1	
58-77	2	97-13	1	49-00	1	89-07	2	
59-06	1	97-34	1	49-65	1	89-66	1	
59-36	1	97-95	1	50-07	1	90-35	1	
59-75	1	98-75	1	50-70	2	90-69	1	
60-44	5	99-20	1	51-49	1	90-95	1	
60-70	1	99-78	1	53-59	1	92-20	2	
61-13	4	4600-40	1	54-48	3	93-80	1	
61-74	1	00-92	1	56-20	1	94-55	1	
62-52	10	01-55	1	56-36	1	95-06	2	
63-20	1	02-94	1	56-80	1	95-33	1	+

3	1 +	4735.50	1	4773.50	1 +	4812.67	1
5	1 +	36.89	1 +	74.10	4	13.3	1 + br
0	1	37.42	4	74.96	1	14.50	1
5	1	38.10	1 +	75.25	1	15.75	1
7	1	38.45	1 +	75.62	1	17.45	1
9	1 +	39.30	1	75.99	1	17.65	1
4	2	39.67	3	76.42	1	18.45	1
0	2	40.80	1	76.66	1	18.73	1
0	2	41.80	2	77.03	1	20.20	2
	1 + br	42.22	1 +	77.40	1	20.79	2
9	2	42.40	1 +	78.44	2	21.35	1
5	1	43.43	1	78.95	1	22.29	1
3	1	43.65	1	81.90	1	22.71	3
6	1	43.88	1 +	82.41	1	25.93	1 +
0	1	45.09	3	82.97	1	26.45	1 +
4	2	47.31	3	84.15	2	29.20	1
2	2	48.40	1 +	84.95	2	29.76	1
2	1	49.05	1	85.36	1	30.00	1
2	1	49.40	1 +	86.72	2	34.20	2
4	1	49.68	1	87.34	1	35.45	1 +
0	1	50.41	1	88.45	1 +	35.81	2
8	3	51.03	1	88.60	1	36.84	2
1	2	51.60	1	89.00	1 +	37.61	1
5	1	51.72	1	89.40	1 +	38.60	1 +
0	1 +	52.48	1	89.83	1 +	39.11	1
4	1 +	52.77	1	91.85	1 +	39.79	1
3	2	53.82	1	93.32	1	41.0	1 + br
6	1	55.69	2	93.51	1	41.87	1 +
0	1	56.30	1 +	95.40	2	42.46	1
0	1	58.01	3	95.75	2	43.20	2
0	1	58.71	1	97.59	1	44.41	1
3	1	60.10	1	99.55	1 +	45.65	3
9	2	61.00	1 +	4801.11	2	46.71	2
2	1	61.42	1	01.54	1	47.09	1
1	2	62.18	1	02.1	1 + br	47.97	4
8	2	62.55	1	02.7	1 + br	48.45	1 +
2	2	64.10	2	03.27	1	50.07	1
9	3	64.66	1	03.77	1 +	50.39	1
5	1	64.95	1	04.15	1 +	50.90	1 + br
2	1	65.46	1	04.83	1 +	51.06	1 +
0	1	65.94	1 +	05.75	1	51.70	1 +
8	1	66.33	1	06.11	2	52.84	2 +
5	1	66.60	1 +	06.40	1	53.77	2 +
8	2	67.73	1 +	07.17	1	55.16	1
5	1	68.39	1	07.84	1	58.20	1 +
5	1	68.95	2	08.75	1 +	58.89	2
0	2	69.51	1	10.56	1	59.64	2
0	1 +	69.96	1	10.95	1 +	61.90	1
5	1 +	71.39	1	12.13	1	62.70	1

4863:38	2 +	4953:90	1 +	5066:06	1	5187:35	1
65:30	1 +	54:28	1 +	71:81	1 +	87:30	1
66:62	1 +	55:56	1	71:95	2	88:80	1
68:80	1 +	56:63	1 +	75:47	3	89:40	1
73:10	1 +	61:05	1 +	76:63	2	91:82	3
74:18	2	61:68	1 +	78:02	1	5200:03	1 br
74:53	1 +	65:40	1 +	79:86	4	00:57	1
77:78	1 +	66:55	1 +	80:66	1 +	01:56	1
81:70	1 +	68:50	1 +	84:35	1 +	02:70	1 br
82:65	4	70:81	1 +	89:8	1 br	05:30	1
85:45	1 +	71:65	2	91:93	1 +	05:67	1
86:35	1 +	72:37	1 +	93:56	1 +	10:52	1
87:3	1 + br	74:26	1	5108:5	1 br	12:08	2
89:75	2	77:32	1	11:76	1	22:10	1
91:48	1 +	84:60	1 +	12:86	2	23:12	1
92:01	1 +	86:08	1	15:20	1 +	23:64	2
92:55	1 +	87:75	1 +	15:40	2	29:93	2
93:05	1 +	88:85	1 +	15:79	1	30:30	1
94:14	2	92:56	1	16:10	1 +	31:00	1
94:93	1 +	94:85	2	17:34	2	31:17	1
95:8	1 + br	98:30	1	18:1	1 + br	37:24	1
96:2	1 + br	5002:97	1	19:0	1 + br	38:65	1
97:30	1 +	05:00	1 +	19:65	1	43:22	1
98:00	1 +	09:25	3	20:35	1	44:64	2
98:37	1 +	11:94	2	20:55	1	46:05	2
98:50	1 +	12:65	1 +	22:36	2	49:35	1
4900:09	2	13:93	1	22:85	1	49:75	1
01:85	1	16:67	1 +	25:17	1	52:17	1
05:03	1 +	17:18	1 +	29:75	2	52:84	1
08:30	1 +	21:60	2	34:63	1	53:60	1 br
08:90	1 +	23:03	2	37:32	1	54:29	1
10:15	1 +	25:3	1 + br	40:65	1 +	56:2	1 br
15:12	2	28:43	1 +	47:75	2	58:65	1
15:48	2	31:90	1 +	49:81	1	60:1	1 br
15:85	2	32:15	1 +	50:15	2	65:83	2
20:07	1 +	33:98	1	50:56	1	71:20	1
20:97	1 +	36:77	1 +	54:12	1 +	72:64	2
24:45	1	37:94	2	54:56	1	74:10	5
26:90	1 +	39:95	1 + br	59:85	2	75:97	1
28:25	1 +	41:02	2	61:65	2	76:40	1
29:9	1 + br	44:20	3	63:46	1 +	77:1	1 br
39:30	2	48:98	1	64:55	1 +	77:66	1
41:59	1 +	51:16	1 +	69:91	1	78:6	1 br
43:64	2	53:45	1 +	74:75	2	78:93	1
44:05	1	53:70	1 +	77:9	1 + br	86:96	1
44:78	2	54:33	1	78:85	1 +	91:09	1
48:84	1 +	55:95	1	81:05	1	91:40	1 +
49:70	1 +	56:15	1 +	81:95	1 +	92:64	1
52:20	1 +	64:10	1 +	82:08	1	94:21	1

5295.08	1 +	5395.48	1	5460.29	2	5532.24	1 +
96.75	2	95.95	1	64.41	2	33.45	1 +
98.40	1	97.85	2	65.55	2	33.76	1 +
99.30	1 +	98.21	1	68.56	4	35.45	2
5303.48	1	98.70	1	70.67	1 +	35.99	1
05.40	1 +	99.24	1 +	72.49	5	37.53	1 +
08.69	2	99.81	1	73.05	1	37.75	1
13.90	1	5401.40	1	73.73	1 +	40.76	1
14.08	1	06.84	1	76.51	1 +	42.30	1 +
14.55	1	09.48	4	77.61	1	42.95	1 +
15.06	1	10.26	1	78.81	1	43.95	1
16.07	1	12.03	1	81.35	1 +	44.84	1
17.76	1	14.35	1	81.55	1	46.73	1
18.25	1	18.04	1	82.20	1	47.10	1 +
23.47	1 +	18.91	1	83.65	1 + br	47.70	1 +
28.23	2	20.61	2	85.07	1	49.01	2
29.70	1 +	21.53	1 +	86.25	1 + br	50.26	2
30.74	4	22.47	1 +	90.60	1 +	50.87	1 +
32.55	1 +	23.67	1	90.90	1 +	51.67	1
35.90	2	26.63	1 +	91.30	1	51.93	1 +
36.39	1	26.77	1 +	91.85	1 +	52.55	1
37.93	1 +	27.49	1	95.98	1 +	54.56	1
43.44	1 +	27.78	1	96.44	1 +	56.48	3
43.98	1	28.50	1 +	98.39	2	57.14	3
48.00	1	29.08	1 +	5504.81	1	58.89	1
50.89	1 +	30.49	1	06.19	1	59.43	2
51.55	1 +	30.76	1 +	06.35	1 +	61.66	2
52.50	1 +	31.62	1	09.17	1 +	62.40	1 +
53.72	8	33.57	1 +	09.65	1	63.21	1
55.38	1	34.15	1 +	10.89	1	64.45	1
55.80	1	35.45	1	12.27	10	65.18	3
56.57	1 +	38.10	1	13.32	1	65.48	1
57.40	1	38.46	1	14.40	1 +	66.18	3
59.70	1	38.66	1	16.29	2	66.66	1
60.10	1 +	41.95	1	17.60	1	68.05	1
62.92	1 +	45.66	1	18.06	1	71.15	1 +
63.55	1	46.40	1 +	18.71	3	72.43	1 +
68.15	1 +	46.68	1 +	20.40	1	75.30	1 +
69.31	1	49.48	2	22.06	1	77.51	1
78.51	1	50.25	1	22.70	1	78.51	1
80.15	1	51.36	1	23.20	1 +	79.14	1
80.30	1 +	52.00	1	24.66	1	82.81	2
82.80	1	54.19	1	26.30	1 +	82.96	2
84.30	1 +	56.60	1	27.05	2	84.89	1
86.55	2	57.42	1	27.40	1	88.32	1
87.00	2	58.10	1 +	28.11	1 +	88.56	1
92.09	1	58.34	1	29.00	1 +	89.45	1 +
93.62	5	59.06	1	30.65	1 +	90.40	1 +
95.11	1	59.42	2	31.40	1 +	90.78	1 +

5593-95	1	5677-95	2	5772-21	1	5842-40	1 +
94-95	2	79-23	1	72-45	1	43-37	1 +
95-21	2	80-48	1	73-18	1 +	44-00	1
96-11	3	83-33	1 +	73-40	3	46-20	1 +
96-94	1	83-96	1	73-8	1 + br	47-94	1
98-20	1	85-15	1	75-29	1	48-57	1
98-55	1 +	86-05	2	76-05	1	49-10	1
99-10	1	88-02	1	78-65	1	51-33	1
99-30	1	88-31	1	82-67	1	53-35	1
5601-52	4	88-67	1	83-05	1	53-58	1
04-41	1 +	91-70	1	84-22	2	53-94	1
06-70	1	92-36	1	85-10	1	55-43	1
10-49	3	93-20	2	87-10	1 +	57-36	1
10-73	1	96-07	2	87-45	1 +	58-80	1
11-12	2	97-21	3	88-39	3	59-61	1
13-93	2	99-43	3	88-80	1	62-72	3
14-96	2	5702-53	1 +	91-60	1	71-10	1 +
20-60	1 +	03-44	1	91-95	1	71-82	2
23-23	1	11-69	2	95-06	1	78-3	1 + br
23-98	1 +	12-53	1	95-55	1 +	79-2	1 + br
25-45	1 +	15-49	2	96-36	1 +	81-95	1
26-94	1 +	16-70	1	96-73	1	85-20	1 +
28-43	1	18-60	1 +	97-69	1	85-60	1
30-59	1	18-81	1 +	5800-06	2	86-53	1
32-70	1	19-26	3	03-07	1 +	87-80	1 +
33-31	1	22-20	1	03-50	1 +	88-74	1
34-66	1	26-06	2	04-12	1 +	89-89	2
37-58	2	26-35	1 +	04-71	2	90-11	1
38-37	2 +	27-46	1	06-45	1	90-37	1
40-36	1 +	29-60	1 +	11-00	2	92-72	1
41-00	1 +	30-70	1 +	12-11	1	93-45	1
46-77	1	32-10	1 +	13-19	3	94-56	1 +
50-82	1	33-50	1 +	15-76	1 +	95-2	1 + br
55-36	3	34-15	1	18-06	1	95-57	1 +
56-40	1 +	35-90	1	19-1	1 + br	97-90	1
60-00	1	39-86	1	20-68	1	98-35	1
60-69	1 +	43-78	3	23-29	2	99-96	1
63-41	1 +	46-72	1 +	23-75	1	5900-93	1 +
63-69	1 +	49-68	1 +	26-86	1 +	01-60	1
64-19	2	58-38	1 +	27-07	1 +	02-90	1 +
64-90	1	58-50	1 +	27-54	1 +	06-25	2
65-56	1	60-39	1	30-45	1	06-57	1
68-17	1	60-81	1	31-69	1	09-53	1 +
69-11	4	61-17	1	32-21	3	10-13	2
70-18	4	64-95	1	32-59	1 +	10-39	2
72-10	1	65-56	1	34-54	1	13-20	2
75-31	1	69-14	3	36-12	3	14-00	1 +
77-08	1	70-19	1	38-40	3	15-09	1
77-46	1	70-64	1	39-64	1	20-68	2

5922·40	1	5987·30	1 +	6077·42	1	6163·47	1
23·24	2	87·60	1 +	77·80	1	64·68	1
23·84	1	89·63	2	78·71	1 +	64·91	1
24·31	1	91·14	1 +	79·56	1	65·70	1
25·19	1	91·90	1 +	80·65	1	75·03	1
26·56	2	92·95	2	81·54	1	78·20	1 +
28·60	3	95·54	2	82·34	1	78·58	1 +
29·00	1	95·70	1 +	86·90	1	80·32	1
29·78	1	97·29	1	89·16	1	82·5	1 + br
30·12	1	6000·45	1	89·6	1 + br	84·20	1
31·95	1 +	02·17	2 +	89·9	1 + br	86·40	2
32·45	1	03·90	1	93·50	2	86·90	1
33·84	1	06·12	2	93·85	1	87·16	1
34·62	2 +	07·05	2	97·2	1 + br	88·05	1 + br
37·98	2	07·60	1	97·9	1 + br	88·65	1
38·70	1	08·80	1 +	98·59	3	92·55	1
41·11	3	10·72	1 +	6100·06	1	95·50	1
41·80	2	11·84	1	00·36	1	95·79	1
42·16	1	12·21	1	03·05	1	96·58	1
42·94	1	13·66	2	04·30	1 +	98·29	1
43·80	1 +	16·80	1 +	05·12	1 +	6202·10	1
45·14	1	20·83	1	09·01	2	07·02	1 +
47·90	1	24·43	3	12·20	1 + br	08·53	1
48·45	1	27·37	1	18·80	1	09·21	2
50·52	1 +	29·38	1	19·15	1	09·79	1
50·87	1	29·90	1 +	20·08	1	11·30	1
51·49	1	30·91	1 +	23·94	2	12·75	1
53·10	1 +	31·47	1	24·57	1 +	13·70	1 +
57·08	1	33·84	1	25·25	1	16·32	1
59·96	2	34·45	2	26·36	1	17·05	1
61·00	1 +	35·72	1	28·10	1 +	20·85	1 +
61·28	1 +	43·60	3	28·78	1 +	21·03	1 +
63·60	1	45·66	1	30·41	1	21·60	1
64·90	1	47·65	2	32·30	2	22·55	1 +
66·42	1 +	52·12	2	33·83	1 +	23·51	1
66·58	1	52·89	1	35·75	1 +	23·82	1 +
68·30	1	56·72	1	39·25	1 +	25·70	1 +
68·85	1 +	57·70	2 +	40·00	1 +	28·47	1
71·00	1 +	58·28	2	41·53	1	29·18	2
71·35	1	59·50	1 +	43·14	1	31·70	1
72·35	1	60·96	1	43·57	2	32·70	3
74·10	1	66·98	1	46·68	1	37·68	1
75·51	1	68·90	1	48·07	1	38·95	1
76·10	4	69·72	2	49·80	1 +	41·70	1
78·70	1 +	72·25	2	51·95	1 +	42·18	1
79·62	1	72·58	1	57·02	1 +	43·16	1
81·45	1 +	75·79	1	57·92	1 +	44·20	1
82·08	1 +	76·16	1	59·2	1 + br	48·05	1 +
86·48	1 +	76·88	1	60·08	1	51·14	1

6253·87	1 +	6318·80	1	6403·40	1 +	6505·74	1 +
58·20	1 +	21·56	1	03·88	1 +	07·44	2
60·6	1 + br	21·90	1	13·11	1	09·30	1 +
62·32	1 +	29·65	1	15·70	1 +	13·90	2
64·52	1 +	32·26	1	25·53	2	17·53	1
66·42	1 +	35·65	1 +	30·31	1	37·75	1
70·10	1 +	37·45	1 +	33·64	1	52·00	1
70·52	1	38·57	1	33·75	1	55·90	1
72·28	5	40·12	1 +	34·67	1	61·08	1
74·00	1 +	40·9	1 + br	36·65	1	63·75	1
76·02	1 +	42·10	1 +	38·34	1	71·14	1
76·70	1 +	44·20	5	40·22	1 +	77·80	1 +
79·37	1 +	45·55	1 +	40·65	1 +	79·4	1 + br
81·80	1 + br	47·00	1 +	40·87	1 +	97·88	1 +
83·8	1 + br	48·55	1 +	42·26	1	6607·19	2
86·7	1 + br	49·00	1 +	46·35	1	10·05	1
93·6	1 + br	49·65	1	55·10	1 +	24·70	1 +
94·7	1 + br	51·55	1	58·29	2	29·15	2
95·80	2	53·8	1 + br	67·12	2	53·00	2
96·40	1	69·41	1 +	67·65	2	66·0	1 + br
97·3	1 + br	71·36	5	69·25	2	75·80	1 +
99·73	3	72·79	1 +	71·22	1	6700·95	1 +
6300·46	2	73·27	1 +	71·98	1	04·65	1 +
02·43	1	79·47	1 +	73·95	2	04·82	1 +
05·5	1 + br	79·90	1 +	74·29	1	06·3	1 + br
07·90	1 +	87·13	1 +	87·25	1	20·6	1 + br
08·25	1 +	90·60	1 +	91·23	1	29·0	1 + br
10·27	2	90·95	1 +	97·28	1 +	74·59	1
10·80	1	93·29	3	99·85	1		
12·85	1	96·58	1	6503·57	2		

Kanten.

3846·63	K. R.
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XV. Cl. Chlor.

Ältere Messungen: Fehlen.

Material: Verschiedene Chloride auf Gaskohle.

Linienzahl: 0.

XVI. Co. Cobalt.

Ältere Messungen: B. Hasselberg, Stockholm Akad. 28 (1896) L. Stütting, Ztsch. für wiss. Phot. 7 (1909).

Material: Metall von C. Schuchardt.

Verunreinigungen: Cu, Fe, Mn, Ni, Ti, V.

Linienzahl: 1830.

2283·65	1 +	2352·97	1	2409·23	1	2464·58	1
84·96	1	53·51	2	10·60	1	64·71	1
86·25	2	54·58	1 +	11·73	3 u	67·80	1
87·91	1	58·29	1	12·97	2 +	70·38	1
91·57	1 +	61·61	1	13·30	1	73·02	1
93·50	1	63·89	2	13·69	1	74·01	1
95·37	1 +	65·12	1	14·17	2	76·73	1
96·19	1	69·76	1	14·55	3 u	83·70	1
96·82	1	70·02	1	15·22	1	85·44	1
98·48	1	70·60	1	15·40	3 u	86·53	1
2300·90	1 +	71·55	1	17·01	1	88·55	1
01·51	1	71·94	1	17·13	1	89·36	1
04·07	1 +	72·95	1	17·45	1	92·25	1
04·30	1 +	73·48	1	17·75	2	94·05	1
05·26	1 +	75·25	1	19·23	1	94·83	1
07·97	2	77·30	1	19·41	1 +	95·65	1
09·11	1 +	78·70	2	20·85	1	96·80	1
11·46	1	78·96	1	22·69	1	2500·60	1
11·73	2	80·60	1	23·73	1	04·63	1
13·75	1	81·90	1	25·06	3 u	05·2	1 +
14·15	2	83·55	2	25·68	1	06·55	2
15·07	2	84·97	1	27·10	1	07·26	1
16·20	1 +	85·90	1	28·49	1	11·12	2 +
16·96	1	86·46	2	28·67	2	13·01	1
17·23	1	87·55	1	29·30	1	13·20	1
20·12	1	88·25	1	30·25	1	17·90	2
21·49	1	88·48	1	32·28	3 u	19·90	1
22·02	1	89·01	2	35·19	3	21·03	1
22·80	1	89·63	2	35·91	1	21·49	3 u
23·26	1	90·09	1	36·51	1	25·09	2
24·44	2	91·51	1	36·66	1	28·67	2
25·63	1	92·07	1 +	36·85	1	29·06	3 u
25·90	1	92·72	1	37·05	1	30·22	1
26·23	2	94·01	1	39·11	1 +	30·65	1
26·55	2	96·32	1	41·15	2	31·45	1
29·20	1	96·90	1	43·00	1	32·26	2
30·05	1	97·12	1	43·63	1	35·45	1
30·45	1	97·37	1	43·89	1	36·02	2 +
36·06	1	97·45	1	46·60	1 +	36·55	1
36·30	1	2400·67	1	49·24	1	38·45	1
37·57	1	00·92	1	50·10	1	42·05	2
38·73	1 +	01·20	1	51·84	1	44·34	2
39·13	1	01·69	1	53·50	1	44·94	1
44·37	1	02·20	1 +	56·31	1	48·40	2
45·65	1	04·25	2	60·28	1	49·37	1
46·26	1 +	06·34	1	60·90	1	53·09	2
47·51	2	07·35	3 u	62·22	1	53·44	2
50·40	1	07·76	1	63·85	1	55·15	2
51·49	1	08·85	1	64·30	1	56·85	2

2559.48	2	2661.80	1	2818.69	1	2999.84	1
61.37	1	63.61	2	20.11	2	3000.66	2
62.22	2	69.65	1 +	21.86	1	05.86	2
64.14	2	74.04	1	23.78	1 +	06.10	1
67.42	2	76.06	2	24.50	1 +	13.70	3
72.32	1	79.83	2	25.29	1	15.77	2
73.00	1	80.20	1	26.91	1	17.33	2
73.10	1	85.44	2	28.55	1 +	17.66	3
74.45	2	94.50	1	34.02	1	19.23	2
74.94	1	94.76	1	34.55	1	20.05	1
75.82	1	95.93	2	37.26	2	22.47	2
78.99	1	2705.50	1	42.46	1	23.66	1
80.43	3	05.94	2	50.15	2	26.49	3
80.95	2	08.88	1	51.05	1	28.31	1 +
82.35	2	16.05	2	59.75	1	31.43	1
85.45	2	19.65	1	61.48	1	34.55	3
87.30	2	22.20	1	62.70	2	38.42	1
90.70	2	28.86	1	67.57	1 +	39.66	2
91.78	1	31.20	2	72.60	2	40.93	1
94.26	1	40.54	2	78.65	1	42.60	3
95.31	1	45.17	2	79.71	2	44.11	10 u
99.28	1	46.10	1	82.34	1	45.13	1 d (Ni)
2601.07	1	50.20	1	83.23	1	48.21	1
06.22	1	52.21	1	86.55	2	49.00	3
10.86	1	58.67	1	92.37	2	50.64	2
13.60	1	61.49	2	95.46	1	54.84	2
13.98	1	63.19	1	95.57	1	60.17	3
14.23	1	64.30	2	99.91	2	61.15	1
14.45	1	66.31	2	2903.30	1	61.94	5
15.45	1	66.47	2	04.40	1 +	62.33	2
16.34	1	68.80	1	07.75	1 +	64.49	2
17.95	1	72.8	1 + br	11.70	1	70.94	1
19.36	1	75.06	1	19.66	1	72.06	3
22.15	1	75.29	1 +	27.78	3	72.45	4
22.35	1	75.67	1	28.91	2	73.64	2
22.54	1	78.92	2	29.62	3	79.49	3
23.54	1	86.00	1	43.60	1	82.73	3
23.85	1	90.40	1 +	55.50	2	82.96	1 +
27.13	1	91.13	1	57.79	2	86.46	2
27.71	2	91.57	1 +	61.3	1 +	86.89	4
30.05	1	92.55	1	69.7	1 +	87.86	2
40.33	1	96.33	2	75.56	1	88.76	1
42.97	1	97.18	2	77.56	1	89.68	3
44.89	1	2803.87	2	78.10	1	90.36	2
46.51	2	04.25	1 +	82.37	1	95.81	2
48.79	3	11.23	1	84.24	2 Ni?	96.50	2
50.04	1	11.64	1	87.28	3	96.80	1
50.40	2	15.06	1 +	89.70	3	97.21	2
53.84	1	15.65	2	96.67	1	98.30	3

1	3171:30	1	3258:16	2	3308:96	2
2	71:51	1	58:58	1	12:33	3
3	73:30	1	60:03	1	12:99	2
2	74:29	1	60:45	1	13:27	2
2	75:06	2	60:99	3	14:21	3
1	77:40	3	62:47	1	14:46	1 +
1	79:98	1	63:35	2	15:20	2
2	80:42	1	64:96	3	18:60	1
1	82:25	3	65:49	2	18:55	2
2	86:05	2	68:15	1	19:31	2
2	86:46	2	69:04	1	19:66	3
2	88:50	3	70:35	2	20:00	3
1	89:87	2	71:92	3	22:06	1
3	91:44	2	72:56	1	22:41	5
2	92:35	2	76:60	2	24:99	1
1	93:30	2	77:44	2	25:44	4
2	95:74	1	77:80	2	26:72	1
3	98:3	1 +	78:23	1	27:14	4
1	98:79	2	78:96	3	28:34	2
2	99:44	2	79:39	2	29:16	1
3	3203:15	2	79:95	1	29:63	3
1	06:00	1	80:74	1	31:88	1
2	10:35	3	81:75	1	33:55	3
1	10:96	3 +	82:23	1	34:31	5
2	13:56	1 +	82:37	1	37:34	3
1	15:46	1	83:49	1	38:68	1
2	17:15	1	83:60	4	39:97	4
1	17:97	1	83:95	1	41:52	3
4 d	19:15	1 +	86:03	1	42:10	2
2	19:31	3	86:66	1	42:88	5
4	23:30	1	87:34	3	44:36	1
1	24:80	2	87:69	1	46:45	1
1	27:15	2	87:94	1	47:10	4
4	27:93	1	92:24	2	47:70	1
3	34:30	1	93:37	2	48:28	4
1	35:69	3	94:04	1	49:33	1
1	37:18	3	94:24	1	49:66	1
3	39:08	1	94:69	2	50:50	1 +
1	41:69	1	97:37	1	51:29	1
2	43:70	1	98:83	3	51:70	2
3	43:99	4	3304:03	2	54:34	1
1 +	45:42	1 +	04:29	2	54:51	5
1	45:86	1	04:95	1	55:27	1
4	47:13	2	05:27	2	56:06	1
3	47:32	2	05:87	2	56:59	2
3	50:17	3	06:54	1	56:97	2
1	51:84	1	07:31	3	58:13	1
3	53:60	1	08:11	1	59:20	1
3	54:37	4	08:65	2	59:42	3

3361.22	1	3417.32	10	3467.37	1	3518.50	10
61.72	4	17.84	2	68.74	1	20.23	4
62.93	3	17.93	2	69.11	2	21.73	3 u
63.41	2	20.64	2	69.80	1	21.85	2
63.89	2	20.95	3	71.53	3 r	23.00	2
64.38	2	21.77	2	72.34	1	23.55	4 u
65.13	1 +	22.63	1	72.85	1	23.83	3
67.25	5	22.92	1	73.60	1	26.00	1
67.98	1	23.03	2	74.17	10 u	26.97	10 u
68.72	1 d	24.67	3	74.40	2	28.09	2
70.48	4	25.93	1	74.68	2	29.19	5
73.40	3	26.60	2	76.50	2	29.96	15 u
74.13	2	27.90	1	78.00	2	30.70	1
74.42	3 d (Ni)	28.34	4	78.60	2	33.51	5
76.34	2	28.89	2	78.90	2	34.91	2
77.20	3	29.82	1	79.74	1	37.85	1
78.50	2	31.76	8	80.17	2	39.57	1
78.86	3	32.46	1	81.68	1 +	40.50	1 +
81.04	1	33.18	10 u	82.02	1 +	42.65	1
81.65	2	35.35	1 + d	83.29	1	43.15	1
82.20	1	35.87	1	83.58	4	43.43	5
83.07	1	37.10	2	85.51	4	44.25	1 +
84.09	2	37.83	4 +	85.85	1	45.08	1 +
85.38	4	38.83	2	87.45	1	46.85	2
85.68	1	39.05	3	87.84	2	48.60	3
87.19	1	41.28	2	89.57	20	50.36	1
87.56	1	43.06	3	90.89	3	50.78	5
87.82	1	43.31	2	91.49	4	51.84	1
88.29	5	43.79	15 u	92.12	1	52.90	2
88.80	1	45.29	1	95.83	5 u	53.16	3
90.54	3	45.56	1	96.20	1	53.31	2
90.92	2	46.21	3	96.80	3	58.93	3
95.07	1	47.43	2	96.90	3	59.75	1
95.55	8	48.49	2	97.49	1	60.47	2
96.61	1	49.26	10 u	3501.90	1	61.03	4 r
98.96	2	49.54	10 u	02.45	15 u	62.25	2
99.54	1	52.18	1	02.80	3 d (Ni)	63.09	2
3400.63	1	52.44	2	03.15	1	64.31	2
01.74	1	53.66	20 u	03.85	2	65.09	5 r
02.14	4 u	54.35	1	04.89	2	68.56	1
03.33	1	55.33	3	05.29	2	69.59	20 u
05.27	20 u	56.58	1 d	06.47	10 u	70.57	2 +
07.02	1	57.05	2	07.75	1	75.13	4
09.05	1	58.16	1	10.00	8	75.53	5
09.29	10 u	60.86	1	10.59	5 r (Ni)	77.39	1
12.50	10 u	61.33	4	12.80	10	77.82	1
12.79	10 u	62.94	10 u	13.61	4 u	78.21	2
13.00	1 +	63.62	1	16.55	1	79.04	2
15.66	1	65.96	10 u	16.78	1	79.15	2

2	3652.70	4	3777.68	2	3908.70	1 +
2	54.59	3	83.87	1	10.13	5 r
4	57.10	3	3805.94	2	15.65	1
1	58.06	2	06.87	2	17.80	5
1	60.85	1	08.25	3	19.77	1
15 u	62.32	4	11.23	2	20.32	1
1	64.7	1 + br	12.62	2	20.75	1
1	68.80	1 +	14.62	2	20.90	2
2	70.20	2	16.48	3	21.27	1
8	74.08	1	16.61	3	22.90	4
2	76.72	5	17.01	2	24.68	1
1	83.22	8	18.10	1	25.33	2
10	84.63	3	20.08	2	29.43	2
2	85.11	1	23.66	2	33.32	1
2	86.62	1	33.05	1	34.07	2
4	90.91	2	35.84	1	34.85	1
1	93.29	3	36.05	1	35.44	1
2	93.63	5	41.60	2	36.13	10
4	99.15	1	42.21	8	38.11	1
3	3702.39	5	43.85	2	39.00	2
2	03.73	1	45.60	20 u	39.21	1 +
2	04.22	5	50.27	1	41.06	5
1	07.62	2	51.09	2	41.91	5
2	09.00	4	52.00	2	42.84	1
1	11.83	1	56.94	2	44.55	1 +
3	12.35	2	61.31	5	45.07	1
1	26.79	2	63.75	2	45.51	6
5	28.96	2	66.97	1	46.75	2
1	30.63	5	70.66	2	47.26	2
1	31.42	1	73.23	10 u	51.89	1
5	32.59	5	74.09	10	52.46	2
1	33.65	4	77.01	5	53.10	8
3	34.30	3	82.06	5	55.14	1
1	36.08	4	84.79	3 r	56.42	1
3	39.34	1	85.45	2	56.74	1
3	39.65	1	90.18	1	57.75	1
2	40.34	2	90.90	1 +	58.10	4
1	45.65	4	91.85	1	58.73	1
3	50.07	3	92.30	2	61.15	3
3	51.75	3	93.20	2 +	65.15	1
3	52.32	1 +	93.45	2 +	65.37	1
2	52.93	1	94.25	15 u	68.75	1
1	54.47	2	95.15	4	69.28	3
2	55.60	3	98.54	2	72.69	4
1	56.44	1	3904.23	2	73.31	5
3	59.83	2	04.94	1	74.90	4
2	60.55	2	05.70	2 Si?	75.45	2
4	74.75	3	06.46	3	77.34	2
2	77.25	1	08.55	1 +	77.89	1

3978·78	3	4059·07	1	4156·59	1	4255·38	1
78·99	2	61·91	1	57·07	1	57·80	1
79·67	4	63·34	1	58·59	2	60·05	1
85·20	1	66·56	5	60·78	1	63·91	2
85·60	1	68·72	4	62·32	3	67·34	1
87·25	3	69·71	1	67·77	1	68·20	1
89·00	1	70·47	1	68·01	1	68·61	2
90·45	3	76·30	3	68·60	1	70·60	1
91·68	2	76·73	1	71·12	2	75·27	1
91·83	3	77·56	2 d ?	72·30	1	76·24	2
91·95	2	79·41	1	72·78	1	84·84	1
92·50	1	79·57	1	76·20	1	85·92	3
94·70	2	81·64	1	77·75	1	87·50	2
95·45	20 u ¹⁾	82·75	2	79·34	2	88·15	1
97·20	1	83·08	2	80·87	1	88·70	1 +
98·09	10	83·78	2	84·66	1	89·85	1
98·69	1	84·27	1	87·46	2	90·37	1
99·33	1	85·74	1	89·66	1	92·10	1 +
4003·85	1	86·49	10	90·88	5	92·40	2
07·40	1	87·07	1	92·99	1	96·05	1
08·07	1	88·45	1	95·03	1	98·08	1
11·10	1	92·56	8	98·00	1	4300·37	1 +
11·25	1	93·03	1	98·56	1	00·69	1 +
12·32	1	93·22	1	4201·24	1	01·20	2
14·09	4	96·11	2	06·31	1	03·41	3
15·35	1	97·36	1	07·76	1	06·05	1
16·95	1	99·97	1	08·65	1	06·56	1 +
19·45	2	4104·57	2	08·90	1	07·58	2 +
21·07	8	04·91	2	10·22	1	09·61	2
23·55	3	08·49	1	15·03	1	10·25	2
25·60	1	08·63	1	20·44	1	13·58	1
26·58	1	09·84	1 +	20·7	1 + br	18·15	1 + br
27·18	4	10·23	1 +	21·25	1	20·53	2
35·74	8	10·70	10	23·94	1	22·57	1
37·33	1	15·30	1	25·28	2	24·48	1
40·75	1 +	18·96	10	28·70	1	26·56	1
40·95	1	21·52	20 u	29·00	1	31·43	3
44·03	1	22·43	2	30·10	1	31·80	1 +
45·56	8	28·20	1	34·15	2 d ?	33·30	1
49·43	1	32·00	1 +	37·16	1	34·53	1
53·10	3	32·30	3	37·50	1	37·70	2
54·08	2	39·60	2	38·53	1	39·19	1 +
54·79	1	40·55	1 + br	40·95	1	39·80	4
55·71	2	46·9	1 + br	41·69	2	40·40	1
57·10	2	50·62	2	42·03	2	41·35	1 +
57·36	3	51·35	1	45·70	2	42·63	1
58·36	4	51·90	1	48·30	2	50·27	1 +
58·76	3	53·37	1	52·48	3	50·81	1 +

1) Rote Komponente stärker.

07	2	4422·17	1	4517·26	4	4601·40	2
03	2	27·08	1 +	18·13	1 +	06·43	1 +
00	1	29·50	1 +	19·45	2	07·45	1
25	1	31·79	2	25·96	1	09·07	1
13	1	36·49	2 d? (Mn)	26·95	2	12·59	1
50	2	38·05	1	28·08	3	14·18	2
02	2	41·19	1 +	31·12	15	18·20	1 +
25	1 +	42·15	1	32·76	1	20·98	2
10	2	45·22	2	33·35	1	22·82	2
70	1 +	45·90	3	34·18	5	23·20	3
40	2	50·96	1	34·92	1	24·71	1
20	1	52·30	1	40·19	1 +	25·91	3
25	1	56·00	1	40·96	2	27·62	1
31	3	56·77	1	41·82	1	29·03	2
25	1	58·74	2	43·99	5	29·58	10
81	5	59·92	1	44·71	1	30·70	1 +
60	2	60·48	1	45·40	2	31·28	1 +
11	3	60·90	1	46·15	2	34·16	1
70	2	64·84	2 Mn?	47·05	1	34·94	1 +
43	1	65·98	2	49·89	6	39·25	1
45	2	67·09	5	52·63	2	41·01	2
29	4	67·70	1 +	53·53	2	42·97	1
67	1	69·75	5	54·38	1	43·95	2
91	1	71·76	3	59·31	1	44·52	2
27	1 +	72·00	2	61·15	1 +	45·35	1
08	2 (Fe)	74·20	1	61·40	1 +	51·30	1 +
39	1	74·36	1	62·12	2	52·70	1
17	1	77·40	2	63·20	1	53·96	1
78	2	78·50	3	63·56	1	55·02	2
11	2	78·82	1	64·14	2	55·79	1
20	1	80·13	1	64·35	2	57·60	2
71	1	81·80	1	64·99	2	63·60	10
44	1	83·76	2	65·79	8	68·55	2
09	2	84·11	3	66·80	2	71·10	1
81	1	84·72	2	70·20	5	76·91	1
86	4	86·90	2	73·94	1	77·48	1
45	1	89·00	1 + br	75·11	2	77·73	1
08	2 +	89·57	1	77·40	1 +	80·62	1
80	1	92·26	1	79·53	2	82·55	10
27	1	92·86	1	80·34	3	84·13	1
19	1 +	93·22	1	81·15	1	86·01	2
85	1 +	94·94	3	81·80	10	87·15	1
91	1	98·13	1	87·11	1	88·66	2
63	2	99·45	1	88·90	2	90·16	1 +
55	3	4500·74	1	89·54	1	93·36	8
93	1	11·79	1	91·59	1	97·18	1
60	1	13·1	1 + br	92·78	1	97·70	1
03	1	14·35	3	94·82	10	98·56	3
51	3	16·05	1 + br	97·10	10	99·33	2

4704.31	3 +	4858.18	1 +	5034.20	1	5219.20	2
09.22	1 +	62.30	1	35.11	1 +	22.67	2
18.68	2	63.65	1	55.95	1 +	30.40	8
21.62	1	68.08	10	60.00	1 +	34.84	1
25.42	1	69.60	2	67.73	1	35.32	6
28.61	3	72.95	1 +	77.01	1 +	37.20	2
32.26	2	80.40	1	77.57	1	43.20	1 +
35.01	3	82.89	3	87.97	1	48.02	6
36.40	1 +	92.67	1	95.13	2	50.12	3
37.92	3	92.98	1	98.20	1 +	54.78	4
38.30	1 +	97.83	2	5100.20	1	57.75	5
42.40	1 +	99.70	3	05.70	3	62.14	1
42.73	1 +	4902.70	1 +	08.45	1	64.40	1
46.30	2	04.38	3 r	09.02	3	65.00	1 +
49.89	10	07.30	1	13.39	2	66.00	3
51.75	1	07.76	1	22.93	3	66.66	10 (Fe)
54.60	3	08.63	1	24.89	2	67.93	1
56.89	3	12.58	1	25.84	3	68.70	4
61.02	1 +	20.40	1	26.36	3	69.70	2 (Fe)
67.35	2	25.10	1 +	33.60	8	76.32	4
68.26	3	28.47	3	41.20	1 +	80.80	8
71.30	5	33.04	1	42.65	1 +	83.60	2
73.70	1 +	35.39	1	45.63	2	84.25	1 +
76.51	4	36.55	1	46.89	4	85.50	1 +
78.42	3	41.53	1 +	49.21	1	86.65	1 +
80.20	4	41.83	1 +	49.93	2	87.83	5
81.64	3	42.52	1 +	53.37	1	92.34	1
82.78	1	43.43	1 +	54.20	3	5301.20	5
85.28	2	44.90	1	54.99	1 +	07.40	1
93.10	10	45.73	1	56.49	3	10.33	2
94.45	1	48.71	1	58.57	2	12.80	4
96.06	2	52.00	1	59.00	2	16.90	4
96.60	1	53.32	2	65.30	2	21.89	2
98.00	2 d?	59.83	1	66.27	2	25.40	4
4801.97	1 +	66.72	2	72.43	1	26.06	2
07.22	1 +	67.65	1	76.22	5	26.39	2 (Fe)
08.42	1 +	68.05	1	77.62	1 + br	28.20	3 (Fe)
13.70	8	71.18	1	79.83	1	31.62	4
14.22	2	72.09	2	80.30	1 +	32.85	3 +
16.09	2	74.65	1	83.21	1 +	33.82	3
17.61	1 +	80.11	2	83.70	1 +	35.02	3
18.50	1 +	81.94	1	92.53	3 (Fe)	36.30	2 +
21.76	1 +	86.60	1	5201.35	1	37.45	1
32.30	1 +	88.10	3	10.20	2	39.61	2
40.50	10 (Fe)	93.20	2	10.97	2	41.34	5
43.68	3	5001.05	1 +	11.91	2	42.89	10
45.22	1	13.50	1	12.85	8	43.58	8
55.48	1 +	22.34	1	14.91	1 +	44.71	2
57.60	1 +	33.50	1	18.34	2 (Ni)	47.63	3

3	3	5489·81	5	5695·13	1 +	6002·70	1
0	10	95·90	3	97 00	1	05·22	3
9	10	5503·40	1 +	5703·29	1	06·50	20
0	1	06·73	1	06·30	1	07·85	20
2	10	08·55	1 +	21·0	1 + br	11·64	1
5	10	16·12	2	34·48	1 +	15·54	1 +
2	2	16·94	1 +	38·19	1	30·86	1
0	2	23·51	8	41·20	1	49·34	20
9	2	24·20	1	51·21	1	58·45	2
3	10	25·23	8	53·15	1 +	70·80	8
0	1	25·87	1	54·28	1 +	82·67	20
4	1	27·35	1	70·62	4	83·49	1 +
3	1	30·99	10	74·59	1 +	86·84	8
0	1 +	33·26	1	90·30	2	93·35	8
6	1 +	36·45	1	93·4	1 + br	6100·92	2
1	3	44·50	1 +	94·2	1 + br	05·69	3
2	4	46·60	3 +	5806·60	1 +	08·12	6
2	2 +	47·19	2	18·40	1 +	17·20	6
5	1 +	59·02	3	26·51	3	22·90	10
2	1	63·95	1 +	30·32	8	28·44	2
8	2	66·10	1 +	35·8	1 + br	29·27	3
0	4	70·62	1	46·78	3	32·60	3
0	2 (Fe)	73·87	1 +	76·28	3	43·97	2
0	4	76·25	1 + (Fe)	77·61	3	46·56	1
5	2	81·50	1 +	78·30	2	58·70	1
3	3	89·49	1 Ni?	81·32	2	60·20	1
	1 + br	90·99	8	83 65	2	69·03	1
9	1 +	92·42	2	86·82	1 +	75·20	1
2	2	94·95	1	90·71	10	76·89	1
5	1	5602·48	1 +	5905·80	2	81·22	3
5	1 +	06·97	1 + br	15·74	10	89·20	10
2	2	16·27	2	17·02	1	91·40	2
2	3 (Fe)	28·00	1 +	22·62	1	93·78	3
7	3	36·30	3 +	23·36	1 +	98·00	1 +
4	15	36·65	1 +	35·61	8	6203·45	1 +
1	1 +	37·91	2	40·72	1	03·87	1 +
3	1 +	40·22	1	46·73	15	05·7	1 +
3	3	42·71	1 +	52·00	1	11·34	8
4	1 +	43·30	2	65·26	2	22·52	1
1	10	47·47	10	65·90	1	23·58	3
3	1 +	52·00	1 +	82·21	2	31·20	10
9	3	59·36	3	83·54	1	32·70	3
9	3	75·69	1	84·40	20	37·35	1
0	2	76·74	1	89·78	1	46·60	2
0	1	79·85	1 +	90·65	1	47·41	5 +
5	1	82·50	1 +	92·11	15	49·70	8
9	10	87·26	1	93·77	1	52·79	1 +
9	5	88·40	1	97·02	3	54·18	1 +
4	2	88·82	2	6000·91	10	56·58	2 Ni?

6257-20	2 +	6333-90	1 +	6430-51	4	6579-50	1 + br
57-81	10	38-17	2	31-29	1 +	92-07	1 + br
63-03	1 +	41-01	2	44-89	4	96-17	10
71-60	10 +	48-00	≥ 0	50-51	30	6617-30	2 +
72-10	1 +	51-66	5	51-38	8	17-70	1 +
73-28	10	52-99	1	55-30	30	24-00	2
75-38	3	74-73	1 +	63-19	3	32-69	5
76-84	3	86-88	3	70-33	1	35-34	1
82-89	20	95-40	10	74-73	3	79-03	2
92-09	2	96-71	3	78-10	15	84-3	1 + br
97-15	1 +	6407-67	1 + br	83-04	1	85-1	1 + br
6311-52	3 + r	08-60	1 + br	90-50	5	6771-29	5
13-28	4	14-88	1 +	6504-44	2	6815-20	4
14-70	6	17-99	10	17-20	1 +	72-62	3
20-62	20	21-91	3	35-3	1 + br	7016-82	1
23-19	1 +	25-31	2	51-69	3	53-11	2
27-90	1 +	30-10	4	63-61	10	85-25	2

XVII. Cp. Cassiopeium.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Ber. 119 II a.
(1910) (Rot).

Material: Cassiopeiumnitrat von C. Auer v. Welsbach, auf Gaskohle.

Verunreinigungen: Ad.

Linienzahl: 164.

2392-26	2	2754-29	5	2955-85	1	3183-86	2
2441-74	1	65-83	3 ¹⁾	60-50	1 +	91-90	3 d?
69-37	1 ¹⁾	96-76	5	63-49	15	98-27	20
81-77	1 ¹⁾	2834-48	2 d ¹⁾	69-98	10	3242-09	1
2537-04	1 ¹⁾	45-22	3 ¹⁾	70-70	3	54-45	20
71-32	3	47-60	8	89-40	5	79-09	15
78-89	4	51-22	1 Ad	3027-41	2	80-59	1
2613-50	3	59-92	1 Ad	31-23	1 Ad	80-70	1
15-50	20 u	85-25	3 ¹⁾	56-86	15	81-89	20
19-35	3	91-50	3 Ad	63-62	2	86-15	1
53-85	1 Ad	92-01	1 +	75-36	1	89-50	15 Ad
57-15	1	94-99	15	77-75	30	3312-30	20
57-92	4	2900-48	15	80-24	3	15-55	1
85-19	3 ¹⁾	03-17	2	80-80	1 + ¹⁾	59-74	30
85-64	1 +	08-61	1	81-60	10	63-06	1 +
2701-80	5	11-53	20	88-14	1	75-62	1 + Ad
16-00	1 + Ad	12-78	1 +	3118-48	8 ¹⁾	76-69	20
29-05	2 ¹⁾	49-85	2 ¹⁾	53-30	1 +	80-00	1
50-59	1 Ad	51-81	4	71-49	5 ¹⁾	85-64	15

¹⁾ Gehört nach G. Urbain, C. R. 152 (1911) einem neuen Element Celtium (Ct) an.

8 ¹)	3647·93	5 (Fe)	4450·99	3	5349·32	1
8	80·03	3	4518·74	20	5402·78	10
30	84·49	5	91·00	1 + Ad	22·10	3
1	94·33	30 Ad	94·20	1 +	38·08	2
1 + Co?	3797·37	2	4645·67	3	76·88	50
1	3841·30	8	48·40	3 +	5535·71	2 Cp?
1	43·74	2	49·00	3 +	56·69	1
1	53·47	2	54·25	2 + Kante?	5736·75	8
1 Ad?	71·0	2 + br	56·65	1 +	75·60	2 +
4 Ad?	71·50	2 +	58·22	15	5800·80	1 +
30	76·80	20	59·22	3	5983·92	20
1	3988·14	15 Ad	74·00	2 +	84·32	20
1 Ad	91·03	1 Ad	75·50	3 +	97·36	1 +
1 Ad	4054·62	5	76·30	2 + d	6004·77	15
50	4112·80	2 +	83·80	2 +	55·29	3
20	22·62	2	4726·29	1 + Ad?	6160·18	3
3	24·87	20	85·62	5	99·94	2
5	54·20	4	4815·24	3	6222·10	100
2	84·40	50	39·61	2 +	28·36	1 +
30	4277·68	4	39·75	2 +	35·59	2
20	81·19	5	39·89	2 +	42·59	3
2	96·19	5 d	4905·08	5	6345·6	1 + br
1 Ad	4306·10	1 Ad?	42·51	3	6462·86	2
2	09·76	4	94·30	15	63·40	50
20	32·91	1	5001·29	10	6945·30	1 +
20	42·20	1	5135·28	15		

Kanten.

K. R.	4684-40	K. R.	4721-15	K. R.	4769-50	K. R.
K. R.	95-70	K. R.	35-20	K. R.	5196-80	K. V.
K. R.	4708-20	K. R.	49-35	K. R.	5206-68	K. V.

XVIII. Cr. Chrom.

essungen: B. Hasselberg, Stockholm Akad. 26 (1894). L. Stütz, Ztschr. für wiss. Phot. 7 (1909). J. M. Eder und E. Valenta, Ber. Akad. 119 II a (1910) (Rot).

Metall von Prof. H. Moissan.

nigungen: Ca, Mg, Mn, Ni, Pb.

hl: 1697.

1	2364.82	2	2366.25	1	2367.98	1
1	65.24	1	66.40	1	68.58	1
1	66.04	1	66.93	2	70.49	1

führt nach G. Urbain, C. R. 152 (1911) einem neuen Element Celtium (Ct) an.

2373·00	1	2553·15	2	2681·51	1	2766·66	4
73·80	1	57·24	2	87·17	3	67·64	1
78·10	1 +	60·80	2	88·13	2	70·01	6
80·00	1 +	66·65	1	90·36	1	71·56	1
83·37	2	68·18	1 +	91·16	3	75·80	1
85·80	1 +	68·62	1 +	96·65	1	77·78	1
86·25	1	71·85	2	98·00	1	78·20	1
89·50	1	72·23	1	98·50	3	80·83	8
92·47	1	77·75	2	98·77	3	81·27	1
92·96	1	78·36	1	2700·68	1	88·00	1
95·86	1	79·25	1	02·05	2	88·25	1
96·45	1	83·13	1 +	02·60	1	90·40	1
99·14	1	84·73	1	03·57	1	95·94	1
99·65	1	88·30	1	03·85	1 +	2800·87	1
2408·74	2	91·96	3	04·83	1 +	10·04	1
08·83	1	2603·66	1	05·50	1	11·30	1
74·16	1	08·50	1	05·80	1 +	12·13	1
79·25	1	10·40	1	10·3	1 + br	14·65	1
91·43	2	12·13	1	12·40	2	16·80	1
92·64	2	12·30	1	16·25	2	18·56	1
95·15	1	13·41	1	17·55	1	20·95	1
96·40	2	18·37	1	22·85	2	22·15	1
99·95	1	19·58	1 +	26·59	5	22·48	2
2500·75	1	20·09	1	27·36	1	26·83	1
02·64	2	20·56	1	32·00	5	28·28	1
04·40	2	20·94	1	36·53	4	30·59	1
07·43	1	22·96	2	37·37	1	31·14	1
08·21	1	25·44	1	39·47	2	35·75	4
09·08	1	26·68	1	40·20	1	38·58	1
10·70	1 + d	29·92	1	41·17	2	39·13	1
12·07	1	38·98	1	42·12	2	40·13	1
13·71	1	39·55	1 +	42·25	2	41·03	1
16·99	2	42·23	1	43·21	2	43·03	1
17·65	1	53·67	3	48·36	3 +	43·35	4
17·96	1	58·70	3	49·09	3	46·10	1
18·15	1	61·84	1	50·85	3	49·40	2
18·80	2	63·51	3	51·70	1	49·94	4
19·61	2	63·78	1	51·99	3	51·47	1
27·20	2	66·12	3	52·97	3 +	54·01	1
28·11	1	68·81	3	55·00	1	55·34	1
28·32	1	69·49	1	55·38	1	55·79	3
29·23	1	71·90	3	56·86	1 +	56·85	1
30·54	1	72·10	1	57·22	4	57·50	1
34·41	1	72·93	3	57·83	3	58·85	1
41·46	2	73·75	1	59·50	1	59·01	3
41·75	1	77·24	4	61·85	3 +	61·05	3
45·30	1	78·24	2	62·71	3	62·70	3
45·73	2	78·85	3	63·17	1	65·21	3
49·60	2	80·39	1	64·49	3	65·45	1

3	2935 65	1	3029·30	3	3111·01	3
1	42·00	1	30·38	3	11·46	1
3	46·93	1 +	31·46	2	13·10	1
2 + d	49·0	1 +	31·55	1	14·56	1
2	53·47	1	32·99	1	14·97	1
1	56·41	1	34·27	3	15·63	1 +
1	59·16	1	37·12	3	18·21	1
2	61·85	1	39·43	1	18·77	3
1	62·50	1	39·87	2	19·31	2
2	63·80	1 + br	40·99	4	19·80	2
2	66·15	1	43·54	1	20·50	2
2	67·79	3	43·77	1	20·82	1
1	69·10	1	46·21	1 +	21·75	1 + br
3	71·22	3	46·66	1	22·31	1
1	72·00	1	47·56	1	23·10	1
2	75·55	3	49·92	1	25·10	3
3	79·85	1	50·23	1	25·97	1
1	80·92	3	52·30	1	27·66	1
5	84·15	1	54·00	8	28·73	2
1	85·44	1	55·07	1	31·30	2
1	85·97	2	56·50	1	32·19	4
2	86·10	2	58·23	1	32·95	2
3	86·22	2	59·60	1	35·05	1
2	86·61	3	61·80	2	36·00	1
1	88·72	3	61·93	1	36·77	2
1	89·28	1	65·17	2	37·72	1
2	92·01	2	71·15	1	38·31	2
2	94·15	2	71·42	1	41·96	2
1	95·21	3	73·80	2	43·80	1 +
2	96·70	3	76·29	1	44·52	3
1	98·22	1	76·66	1	45·70	2
1	98·91	3	77·91	2	47·31	2
1 +	3001·01	3	80·84	1	48·53	3
1 +	03·85	1	84·65	1	52·31	1 +
1	05·19	3	86·86	1	53·01	2
2	11·20	1	87·61	1	53·65	1
2	13·12	2	94·40	1 +	55·27	3
2	13·80	3	95·46	2	58·97	1
2	14·90	3 d	95·93	2	59·70	4 +
2	15·04	2	96·15	1 +	63·87	3
1	15·29	2	96·60	1	64·60	1
1	17·62	2	96·77	1 +	67·65	1
1	17·69	2	99·56	1	68·87	1
1 +	18·57	2	3103·53	1	69·67	1
1 +	18·92	2	04·80	1	77·73	1
1 +	20·76	2	05·66	1	79·35	2
1	21·68	3 d	05·95	1	80·82	3
1 +	24·47	4	07·35	1 + br	81·54	1
1	24·76	1	09·41	2	85·46	1

3188-11	5	3296-95	1	3349-41	2	3427-80	1
92-23	1	97-42	1 +	51-70	2	31-41	2
94-11	1	98-40	2	52-10	2	32-10	1
97-20	2	3300-90	1	53-19	2	32-44	1
98-19	1	02-30	2 +	53-74	1	32-96	1
3208-64	1	02-96	1	56-53	1 +	33-43	2
09-29	2	04-47	1 + br	56-87	1 +	33-74	4
11-38	2	05-30	1	57-55	1	34-23	1
17-48	2	07-83	2	58-68	2	35-60	1
18-26	1 +	09-94	1	59-34	1	35-81	2
18-80	2 +	11-41	1	60-45	2	35-95	2
19-70	2	12-20	1 +	61-89	1	36-31	4
26-67	1	12-83	1 +	62-40	2	39-49	1
27-35	1	13-15	1 +	62-87	1	41-25	1
29-31	2	13-84	1	65-69	1	41-59	3
33-39	2	14-30	1 +	67-70	2 +	45-75	3
35-25	1	14-62	1	68-21	3	47-15	1
37-38	1	15-30	1	70-40	1 +	47-57	2
37-82	2	16-30	1	74-75	1	47-89	1
38-21	2	16-61	2	75-10	1	48-33	1
38-61	1	18-2	2 + br	76-56	2	51-00	1
38-87	1	21-33	1	78-50	1	53-50	3
39-04	1	23-38	1	79-32	2	53-90	2
39-28	1	24-20	1	79-50	1	55-41	1
41-06	2	24-50	1	79-99	1	55-75	2
44-82	1	26-73	2	82-21	1	58-22	1
45-62	3	27-37	1 + br	82-82	2	60-56	1
47-40	2	28-50	1	84-40	1	63-85	1
51-70	1	29-21	2	84-80	1	64-99	1
51-98	2	30-75	2	85-46	2	65-37	2
53-40	1	33-03	2	86-65	2	65-73	1
55-05	2 + br	33-75	3 + br	88-82	2	67-15	1
56-25	1	34-85	2 +	90-93	1	67-84	1
57-95	2	35-05	2 +	91-55	2	68-88	1 +
59-83	1	36-48	1	93-17	1	69-72	1
60-10	2	37-09	1	93-98	1	70-55	1
62-95	1	37-35	1	94-45	1	70-65	1
66-73	1	39-90	2	3402-53	1	71-65	1
67-16	1	41-55	2	03-45	2	72-92	1
70-22	1	42-70	2	03-76	1	73-02	1
70-81	1	43-39	2 d?	07-40	1 +	73-76	1
72-05	1	44-61	1	08-18	2 +	74-53	1
75-87	1	45-24	1	08-90	3	75-00	1
77-95	1	45-46	1	09-50	1 +	75-26	1
84-95	1	46-13	3 r	11-18	1 +	77-31	1
86-43	1	46-85	3	21-35	3	78-91	1
87-8	1 + br	47-56	1	21-86	1	79-25	1
93-91	1	47-91	2	22-88	3	79-45	1 +
95-52	1	49-13	2	26-13	1	80-45	1

3481.46	2	3602.70	1	3686.95	2	3793.44	2
81.71	2	03.89	2	87.42	2	94.00	2
83.66	1	05.49	30 u	87.66	2	94.75	1
84.31	1	08.55	1	88.23	1	97.29	2
86.63	1	09.65	2	88.57	2	97.85	2
88.56	1	10.20	2	89.41	1	3800.7	1 + br
95.11	1	12.73	1	89.77	1	01.4	1 + br
95.52	1	13.30	1	96.01	1	02.4	1 + br
3501.60	1 +	13.80	1	3705.12	1 +	03.2	1 + br
01.90	1 +	15.77	2	10.25	2	04.95	5
02.45	1	19.57	2	10.75	1	06.97	2
08.25	1	26.90	1	13.10	1	08.06	1
09.00	1	29.56	1	14.52	1	10.4	1 + br
10.5	1 + Ni?	32.98	3	15.33	1	12.36	2 +
10.68	1	35.15	1	16.19	1 +	14.71	3
11.96	1	36.40	1	16.68	1	15.60	2
17.33	1	36.70	4	18.38	1	17.96	2
18.53	1	39.97	5	26.12	1	18.62	1
19.6	1 + br	40.55	2 (Fe)	30.96	3	19.72	1
19.8	1 + br	41.61	2	32.19	3	20.14	1
23.75	1	41.99	3	43.10	2	21.00	1
27.22	1 +	45.73	1	43.71	3	22.25	1
31.23	1	46.30	1	44.03	4	23.68	1
37.38	1	48.66	2	44.67	2	25.51	2
48.1	1 + br	49.11	3	47.42	1	26.58	2
49.15	2 + br	50.00	1	48.75	2	30.20	3
50.81	3	52.75	1	49.15	3	31.20	2
53.0	2 + br	54.07	3	51.34	1 +	32.50	1
55.90	1	56.40	3	55.99	1	34.94	2
56.27	1	60.15	1	57.30	2 +	36.22	2
58.66	3 +	61.42	1	57.80	3	41.43	2
59.95	1	62.56	1	58.18	2	42.22	1 +
62.41	1	63.01	2	64.76	1	44.40	1
62.63	1	63.36	2	67.60	1 +	47.6	1 + br
63.06	1	65.64	1	68.37	5	47.9	1 + br
64.42	1	66.14	1	68.86	2	49.10	2
64.87	1	66.32	1 +	69.14	1	49.45	2
66.28	3 +	66.78	2	78.06	1	49.60	2
72.90	2	68.17	1	80.22	1 +	52.33	2
73.80	1	72.10	1	80.90	1	53.30	2
74.19	1	76.45	2	83.75	1 +	54.36	3
75.00	2 + u?	77.79	1	86.38	1	54.95	1 +
78.81	30 u	77.98	1	87.29	2	55.41	2
82.80	1	79.18	1	89.87	1 +	55.73	2
84.47	1 + br	79.97	2	90.35	1	56.41	1
87.12	2	81.82	1	90.62	2	57.75	3
93.64	30 u	85.12	1	91.52	2	59.0	2 + br
99.54	1	85.40	1	92.29	2	62.69	1
3601.81	3	85.70	2	92.55	1	68.40	1

3870.4	2 + br	3962.35	1	4034.12	1	4095.13	1
74.70	2 + br	63.85	10	35.30	1	98.0	2 + br
75.3	2 + br	69.22	2	37.42	2	99.19	2
77.50	1	69.90	3	37.77	1	99.60	1
79.39	3	70.20	1	39.20	2	4100.00	1
80.56	1	71.41	3	39.42	1	01.33	2
81.41	3	72.83	2	41.97	1	04.01	1
82.05	1	76.44	1	42.40	2	05.00	2
85.36	4	76.85	8	43.86	2	06.22	1
86.92	2	78.80	3	44.35	1	08.56	1
91.00	2	79.41	2	46.93	1	09.73	2
92.06	2	79.95	3	48.91	2 (Mn)	11.1	2 + br
94.20	3	81.41	3	49.20	1	19.60	1 +
94.76	1	83.40	2	49.95	1	19.88	1 +
97.79	1	84.08	4	50.20	1	20.78	2
3902.24	2	84.50	3	51.49	2	21.45	2
03.05	3	88.02	1	55.5	1 + br	21.70	1
03.29	2	88.80	1	55.75	1 + br	21.98	2
07.91	1	90.14	2	56.19	2	22.35	2
08.91	8	91.30	4	56.95	2	23.54	2
12.15	5 +	91.82	3	57.39	1	25.67	1 +
14.48	1	92.29	1	57.97	1	26.69	2
15.68	1	92.99	3	58.94	3	27.10	1
15.98	2	94.13	2	60.82	2	27.46	1
16.41	2	96.45	1	64.32	1	28.56	1
17.19	2	99.04	1	65.88	2	29.4	2 + br
17.80	2	99.83	2	67.09	3	31.55	2
19.32	8	4000.12	1	67.98	1	34.55	2
20.25	1	00.78	1	68.60	1	37.57	1
21.21	5	01.61	3	68.84	1	38.13	1
26.82	2	04.08	2	71.20	2	39.3	1 + br
28.82	4	12.61	3	72.97	1	42.39	1
29.85	1 +	14.81	2	75.00	2	42.65	1
38.54	2 +	15.98	1	76.20	2	46.38	1
39.50	1	18.35	2	77.25	2	46.65	1
41.67	4	21.59	1	77.85	2	46.86	1
43.78	1	22.40	2	81.90	1	48.65	1
45.64	2	23.60	1	82.08	1	51.85	1
46.10	2	23.90	2	85.20	1	52.93	2
49.00	1	24.73	1	86.14	1	53.23	2
49.71	1	25.18	3	86.27	1	54.00	3
51.26	2	25.63	1	87.10	1	61.55	3
51.93	2	26.31	3	88.93	1	62.67	1 +
52.55	2	27.23	3	89.80	1	63.79	3
53.30	2	28.21	1	90.2	1 + br	64.43	1
56.54	1	28.64	1	90.50	2	65.70	3
56.82	1	31.28	1	92.35	2	70.00	3
58.22	1	33.16	2	93.25	1	70.40	2
60.91	2	33.44	2	93.50	1 +	71.86	2

Cr

Bogen

2	4231.55	1	4305.61	2	4375.49	3
1	31.82	1	07.67	1 +	76.95	2
1	32.41	2	09.89	1	77.69	2
4	33.05	2 +	10.60	1 +	79.95	1
1	34.70	2	12.65	1	81.30	2
2	37.90	2	12.95	1	83.05	1
1	39.12	3	14.16	1	85.15	8
2 +	40.89	2	18.10	1	87.64	3
4	41.36	1	19.52	1 +	91.93	3
1	42.55	1	19.80	2	92.50	1
1 + br	43.01	1	20.78	2	93.74	1
2 +	48.45	1	21.44	1	95.61	1
1	48.87	1	21.81	1	97.44	2
2	52.39	1	23.70	2	4400.01	2
1	54.51	50 u	25.25	3	03.62	3
2	55.70	1	32.75	2	06.46	1
2	56.80	1 +	37.74	10	06.87	1
1	57.54	1	38.56	1	09.76	1
3	59.32	1	38.95	1	10.49	2
1	60.40	1 +	39.62	4	11.35	3
2	61.51	2	39.90	3	12.44	2
1	61.80	1	40.31	2	13.21	1
2	62.30	1	41.36	1	14.02	2
1	62.56	1	41.60	1	14.55	1
1	63.30	3	42.17	1	19.30	1
2	67.01	1	43.33	2	21.19	1
2	68.95	1	43.89	1	22.8	2 + br, d
2	70.15	1	44.68	10	23.55	1
2	73.10	1	45.27	1	24.49	3
2	75.00	50 u	45.95	1	25.31	1
1	76.13	1	46.99	3	26.87	1
2	78.00	1 +	47.64	1	27.90	1
1	80.57	3	49.00	1 +	28.66	2
2	84.90	1	51.22	5	30.09	1
2	85.10	1	51.98	10	30.72	2 +
3	88.58	1	54.13	2	32.35	2
2	89.90	50 u	55.5	1 +	33.00	1
1	92.14	2	56.50	1	34.15	1
2	93.71	2	56.95	2	43.89	1
2	95.91	3	57.69	2	50.5	1 + br
2	96.46	1	59.82	8	53.50	1
2	96.80	1	63.31	3	55.62	1
3	97.21	2	64.3	1 +	56.77	1
2	97.89	3	65.03	1 +	58.72	3
1	99.85	2	68.45	1	59.57	1
1	4300.13	1	71.48	10	59.92	2
2	00.66	2	73.42	3	60.90	1 +
2	01.35	2	73.81	1	61.50	1
1	02.95	1	74.32	3	62.91	2

4464·85	2	4526·66	5	4581·27	1	4628·69	1
65·09	1	27·58	4	82·25	1	30·66	1
65·53	2	30·02	2	82·65	1	32·39	2
66·35	1	30·91	5	84·12	1	33·49	2
67·74	2	32·95	1	84·30	2	34·30	1
68·55	1	35·33	3	85·25	2	34·80	1
68·84	1	35·89	8	86·31	2	35·63	1
69·99	1	39·94	3	88·06	1	37·36	2
70·67	1	40·64	3	88·40	1	37·95	2
73·96	2	40·88	3	89·22	1	39·78	3
75·50	3	41·23	3	90·78	1 +	40·79	1
77·20	1 +	41·65	3	90·90	1 +	41·9	1 + br
77·66	1	42·76	2	91·61	8	42·21	1
78·14	1	43·89	2	92·30	1	42·60	1
79·05	1	44·78	4	94·01	1 +	44·11	1
80·45	2	45·47	2	94·63	1	46·35	20
81·64	1	46·10	5	95·2	1 + br	46·99	2
83·02	3	46·77	1	95·79	3	48·29	2
84·55	1	48·85	1	96·61	1	49·01	2
88·21	2	50·65	1 +	97·15	1	49·61	3
89·62	2	53·10	1	98·64	2	51·49	8
90·8	1 + br	54·17	2	99·21	1	52·38	10
92·00	3	55·01	2	4600·30	3	53·00	1
92·50	3	55·30	2	00·90	5	54·3	1 + br
95·50	1	55·51	1	01·21	3	54·94	2
97·03	10	56·35	3	02·80	1	56·38	2
98·87	3	58·47	1	04·75	1 + br	57·02	1
99·46	1	58·86	2	05·90	1 + br	61·47	1
4500·42	3	61·71	1	06·57	1	62·10	1 +
01·25	3	63·48	2	10·09	1	62·65	1
01·90	2	63·67	1	11·26	1	63·53	3
02·43	1	63·89	2	12·15	2	64·05	3
03·25	1	64·36	2	13·53	8	65·00	5
04·13	1	65·70	4	14·30	1	66·10	2
06·99	2	66·40	1	14·70	1	66·40	1
08·20	1 + br	66·79	1	14·93	1	66·72	2
08·95	1	69·80	4	16·28	10	67·34	1
10·22	1	70·52	1	19·00	1	69·52	3
12·10	4	70·75	1	19·70	4	69·90	1
12·80	1 +	71·28	2	21·25	1	70·30	1
13·45	1	71·89	4	22·10	3	73·37	1
14·70	8	74·43	1	22·62	2	75·3	1 + br
15·60	2	74·68	1	22·95	2	76·5	1 + br
18·83	1	75·30	2	24·75	2	77·80	1 +
20·00	1	76·99	1	25·54	1	80·70	2
21·32	2	78·50	1	26·35	10	81·10	2
22·25	1	78·8	1 +	27·03	1	84·80	1
25·00	1	79·80	1 +	27·54	1	86·40	1
26·28	2	80·26	8	27·86	1	89·55	3

4690.35	1 +	4761.97	1	4851.70	1	5139.81	2
93.20	1	64.48	3	55.38	1	44.85	1
94.15	2	64.87	1	57.55	1	61.94	1
94.96	1	66.88	2	61.40	2	66.41	2
95.35	2	67.47	2	62.01	3	77.57	1
97.25	2	68.02	2	64.55	1	84.73	2
97.60	1	68.80	1	70.99	3	92.18	2
98.71	4	70.0	1 + br	74.82	1	93.67	1
99.17	1	70.90	1	75.70	1	96.61	2
99.80	2	71.79	1	76.60	1	5200.37	1
4700.80	2	74.76	1	80.21	1	04.71	20
01.76	1	75.32	1	85.13	1	06.24	30 u
02.13	1	75.73	1	86.01	3 d	08.60	30 u
05.60	1	77.81	1	87.20	3	12.40	1 +
06.29	2	80.11	1	87.88	1	14.27	2
08.20	10	83.25	1 + br	88.71	2	21.10	1
14.20	1	87.95	1	94.57	1	21.93	2
17.78	1	89.53	5	98.67	1	22.85	1 +
17.90	1	90.55	2	4903.47	3 (Fe)	24.24	1 +
18.63	10	92.72	4	05.24	1	24.70	1 +
21.35	1 +	94.70	1	19.64	1	25.19	4
22.90	1	96.33	2 +	21.15	1	26.00	1
23.31	2	97.1	1 + br	22.49	4	27.09	1
24.10	1	97.91	1	23.50	1	28.25	1
24.60	3	98.77	1	30.36	1	30.35	1
25.91	1	99.43	1 +	31.30	1 +	39.12	1
26.13	1	4801.24	5	36.50	3	40.62	1 +
27.32	3	04.88	1	42.68	3	43.53	1
29.92	3	05.47	1 +	44.75	1	47.72	8
30.90	4	06.48	1	49.77	1 +	55.21	5 d
36.35	1	09.52	1	53.90	1	61.91	1
37.52	6	10.95	1	54.99	3	64.35	8
41.31	1	14.50	1	65.10	2	65.33	1
43.33	1	16.35	1	86.14	1	65.90	3
45.49	2	24.16	1	5004.55	1 + br	72.18	2
47.26	1	24.40	1	13.49	2	73.59	1
47.87	1 +	25.71	1	18.80	1	75.33	3
51.32	1 +	29.53	5	22.04	1	76.06	5 + d
52.29	3	31.86	1	48.95	1	78.39	1
53.10	1	35.90	1 +	52.08	1	80.48	1
54.92	2	36.55	1 +	66.06	1	87.34	1
55.33	2	37.06	2	67.87	2	93.03	1 +
56.30	8	38.63	1	68.45	1 +	93.55	1 +
57.07	1	40.60	1 +	73.10	1	96.86	4
57.53	1	41.97	1 +	92.03	1	97.48	2 + br
57.80	1	43.30	1 +	5110.93	1	98.46	4 +
60.10	1	46.52	2 +	13.30	1	5300.89	4
61.05	1	47.41	1	22.27	1	04.33	2
61.45	1	48.46	1	23.63	1	13.02	2

5318·92	2	5554·50	1 +	5784·17	8 +	6135·99	2 +
28·53	10 +	68·51	1	85·29	6 +	62·48	15 (Ca)
29·33	3 +	74·63	1	86·08	5 + d?	6261·50	1
29·95	3 +	5628·82	3	87·25	2	6313·42	1
40·65	2	38·37	1	88·22	10	15·99	1
45·00	1	42·59	2	88·59	2	22·75	1
45·99	20	48·40	1 +	91·30	15	27·61	1
48·50	10	49·52	2	92·00	1	30·30	4
68·72	1	58·82	1	96·98	2	42·95	1
70·54	1	64·24	3	98·10	1	63·03	4
71·67	2	74·44	1	98·68	1	6501·43	1
73·90	1	81·42	2 +	5801·43	1	29·36	2 +
87·14	2	82·63	2 +	38·88	2	38·12	2
87·73	2	94·94	3	43·46	1	73·10	2
90·60	1	98·53	4	44·84	2	81·19	1
91·56	1	5700·75	1	76·77	1	94·91	1
5400·75	3 (Fe)	02·52	3	84·67	2	97·80	1 +
05·19	1	12·87	1	88·20	1	6630·25	2
10·01	20	12·98	3	89·02	1	43·27	1
42·60	1	20·03	1	90·23	1	61·30	3
64·12	2	29·41	1	5902·35	1	69·50	1 +
80·71	2	38·75	1	59·42	1	6881·7	1 + br
5508·40	1	46·64	1	64·15	1 +	82·4	1 + br
10·15	1	53·89	2	70·91	1	83·2	1 + br
12·5	1 + br	72·89	1	6029·50	1	6924·4	1 + br
19·77	1 +	81·42	3 +	45·63	1	25·4	1 + br
41·0	1 + br	82·10	3 +	47·88	1	78·75	1 +
48·81	1	83·38	5 +				

Kanten.

5794·7	K. R.	6052·0	K. R.	6063·1	K. R.	6394·7	K. R.
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XIX. Cs. Caesium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1890.)

H. Lehmann, Ann. d. Phys. 5 (1901) (Ultra Rot). J. M. Eder und

E. Valenta, Wiener Akad. 119 IIa (1910) (Rot).

Material: Caesiumchlorid von E. Merck.

Verunreinigungen: Ba, Ca, Li, Rb, Sr.

Linienzahl: 14.

3612	1 + br	3889·2	1 + br	4593·39	50 u ¹⁾	5845	1 + br
3876·8	1 + br	4555·50	200 u ¹⁾	5664·4	1 + br	6010·5	2 +

¹⁾ Rote Komponente stärker.

0	10 +	6355·3	2 + br	6723·6	50 + u ¹)	6974·5	5 + u
3	1 + br	6587·3	3 + r, br				

XX. Cu. Kupfer.

Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).

M. Eder und E. Valenta, Wiener Akad. 119 II a (1910) (Rot).

al: Käufliches Metall.

einigungen: Ag, Bi, Ni, Pb, Sn, Zn.

zahl: 368.

8	1	2630·10	2 +	2858·40	3	3025·11	3
0	1	35·50	2 +	58·86	3	30·38	2
5	1	45·41	1 +	66·30	1	36·22	10
0	2 u	49·90	1 +	74·70	1 +	37·21	1
5	1	51·80	1 +	75·80	1 +	39·20	1
3	2 u	71·30	1 +	83·10	8	39·60	1 +
8	2 u	72·15	1 + br	85·93	1	44·17	2
9	1	76·55	1 +	91·00	2 +	52·64	1 +
	1 +	2701·10	1	91·80	2 +	53·51	1 +
1	2 u	02·70	1 + br	2911·35	1 +	63·54	10
4	1	03·30	1	22·98	1 +	69·01	1
6	2 u	13·61	1	23·38	1 +	70·90	1 + br
1	1	15·60	2 +	23·83	2 +	72·20	1
5	1 +	20·28	1 +	25·00	1 +	73·94	8
8	2 u ²)	24·03	2 +	25·55	1 +	78·93	1
0	1	45·53	1 +	38·99	1	80·32	1
3	3 u	51·35	2 +	51·36	2 +	88·22	4
7	2 +	51·9	1 + br	61·31	20	94·12	10
0	1	63·89	2 +	74·83	1	3100·05	10
9	1 +	66·51	50	78·41	3 +	08·70	20
7	2	68·94	2 +	79·52	3 +	13·59	2 Co?
2	5 +	69·35	1 +	82·28	1	16·44	15
8	1	82·73	2 +	82·93	1 +	18·45	1
0	3	83·67	2 +	86·05	1 +	20·58	3
5	2	86·62	1 +	91·90	1 +	26·25	15
4	5 u	92·05	1 +	97·50	10	28·80	10
0	1	2802·77	1 +	98·50	2	31·45	1 +
5	1 + br	03·75	1 +	3010·99	10	37·9	1 + br
0	1 + br	05·80	1 +	13·94	1	40·44	8
6	50 u ²)	24·50	20	14·97	2 +	42·55	10
	1 + br	37·73	1	21·72	5	46·95	10
9	2 +	46·60	1	22·72	4	49·63	2

iolette Komponente stärker.

ote Komponente stärker.

3151.78	1 +	3396.49	2	3620.50	3	3933.15	1 +
56.73	3	3402.39	6	21.38	10	47.03	1
60.18	2	04.80	4 +	24.35	5 r	64.30	1 +
69.80	8	13.47	2 +	27.46	8 +	65.8	1 + br
76.0	2 + br	15.90	3 +	29.91	2	4003.18	2
78.34	1	20.28	1	32.70	2	11.00	1 +
94.22	10	22.3	2 + br	36.05	3	15.8	1 + br, v
3208.30	8	34.12	1 +	41.85	3	22.88	100
11.52	2	36.15	1	45.37	3	50.79	2
23.56	3	37.93	1	48.54	2	56.6	2 + br u, v
24.80	3	50.47	10	51.01	1	62.91	100
26.69	3	54.89	8 +	52.5	2 + br	63.60	10 +
31.29	5	57.97	6	54.5	2 + br	73.42	1 +
34.04	1 +	59.53	2	56.00	2	75.75	2
35.84	5	63.7	1 + br	56.90	1	80.70	2
43.28	8	65.55	2 +	59.49	2	4104.37	3
47.68	1000 u	72.27	3	65.87	2	23.40	2 +
66.16	3	74.70	1	72.09	2	77.84	10
68.38	3	76.12	8	76.97	2 + br	4231.2	1 + br
74.09	1000 u	82.0	1 + br	84.75	2	42.40	2 +
77.45	2	83.90	8	85	1 + br	49.12	8
79.94	8	87.68	2	87.7	2 + br	53.50	1 + br
82.83	5	88.93	2	99.24	1	59.57	2 + br
90.67	20	92.09	1	3700.69	6	67.4	1 + br
92.50	2	98.19	3	12.12	2	75.29	20
93.08	4	3500.42	2	20.90	2	4328.9	1 + br
3308.09	20	01.46	1	21.83	1	36.2	1 + br
17.34	6	01.67	1	34.35	3	54.8	1 + br
19.81	5	07.53	1	41.39	4	78.30	20 +
29.76	4	10.46	1	59.61	2	97.2	1 + br
35.37	4	12.26	8	64.97	1 +	4415.7	2 + br
37.95	10	17.16	2	72.02	3	80.60	10
41.30	1	20.15	4	80.20	1	4507.6	2 + br
49.40	6	24.36	6	3800.02	1	09.57	8
51.37	1	27.61	6	00.61	2	13.40	1 +
54.61	5	30.54	10	03.6	1 + br	31.00	15
58.45	1 +	31.06	1	05.40	3	39.9	3 + br
58.90	1 +	33.89	10	12.07	1 +	87.17	20 +
62.10	1 +	45.08	3	13.65	2	4642.8	1 + br
65.51	10	46.56	2	17.65	1	51.39	20
75.81	2	66.28	1 +	21.03	2	74.95	4 +
79.83	1 +	94.17	2	25.20	2 +	97.65	2 + br
80.03	1 +	98.18	2 +	60.61	3	4704.82	8
81.28	3 +	99.28	10	61.85	3 +	67.5	1 + br
81.57	4	3602.19	10	62.90	1 +	76.4	1 + br
84.96	2 +	09.43	2	81.86	1	94.3	1 + br
88.2	1 + br	10.93	3	99.3	1 + br	97.25	1
92.17	1	13.89	5	3921.40	2	4843.55	1
95.61	2	14.35	3	25.40	2	59.12	2

4866.4	1 + br	5105.80	50	5292.63	8 r	5700.45	30
83.44	1	12.13	1	5322.66	1	32.52	1
4966.64	1	43.33	1	52.90	1	82.32	50
66.90	1	44.3	1 + br	55.2	1 + br	6223.87	1 +
76.38	1	53.45	100	60.23	1 +	68.42	1 +
84.32	2	88.96	1	91.84	2 + br	6325.6	1 + br
91.58	1	5201.1	1 + br	5408.5	1 + br	6474.47	1 +
5016.81	2	18.40	200	32.3	2 + br	85.40	1 +
34.5	1 + br	20.22	20	5536.0	2 + br	6621.87	1 +
76.4	1 + br	50.7	1 + br	55.13	2	6741.8	1 +
93.26	2	60.2	1 +	5631.87	1		

XXI. Dy. Dysprosium.

Ältere Messungen: G. Eberhard, Publ. des Astr. Obs. Potsdam 20 (1909). J. M. Eder und E. Valenta, Wiener Ber. 119, IIa (1910) (Rot).

Material: Dysprosiumnitrat von C. Auer v. Welsbach.

Verunreinigungen: Nh?

Linienzahl: 3312.

2357.00	1	2668.16	1	2779.67	1	2815.34	2
92.25	1	70.36	1	82.72	1	16.50	3
2410.11	1	76.94	1	82.83	1	17.83	1 +
22.84	1	77.44	1	85.67	1	19.80	1
39.90	1	79.98	1 +	85.83	1	20.15	1
41.74	1 +	89.36	1	86.14	1	22.94	1
60.05	1	92.12	1	86.33	1	24.65	1
81.02	1	92.93	1	91.55	1	25.57	2
92.25	1	2709.10	1 +	96.64	1 +	25.94	1
2513.65	1	27.26	1	98.92	1	26.89	1 +
43.95	1	29.59	1	99.10	1	27.22	1
52.40	1 +	39.43	1 +	2800.45	2	27.45	1
58.03	1	40.80	1	00.65	2	27.73	1
60.30	1	52.16	1	01.50	1	28.48	1
66.35	1	52.27	1	03.35	1	29.48	1
85.41	1	57.19	1	03.97	1	32.20	1
92.14	1	65.33	1	08.74	1 +	34.00	1 +
2600.25	1	66.50	1	09.82	1 +	34.91	1
00.86	1	66.59	1	10.29	1 +	35.27	1
08.80	1	71.30	1	10.67	1 +	35.37	1
18.46	1	72.50	1	10.95	2	35.85	1
23.77	1	72.70	1	11.20	1	36.24	1 +
34.89	2	73.93	1	11.54	2	37.10	2
39.88	1 +	74.35	1	12.28	1 +	37.48	1 +
42.26	1	74.63	1	12.91	1 +	37.70	2
45.45	1	75.64	1	14.70	1 +	38.46	1 +

2839:30	1	2884:40	2	2917:37	1	2950:44	3
39:94	1	84:94	2	18:00	1	51:00	1 +
41:10	1 +	85:17	1	18:41	1	52:25	2
42:14	1	85:62	2	18:74	2	52:70	1 +
43:00	1	86:35	1	19:49	1 +	53:16	2
45:24	1	87:20	1 +	20:01	1 +	53:83	2
46:48	1 +	88:04	1	20:45	1	54:40	1 +
47:70	1	88:35	1 +	21:08	1	55:10	1 +
47:99	1	88:65	1 +	22:21	1	55:65	1 + d
48:47	1	88:90	1 +	23:24	1	56:10	1
49:06	1	90:57	2	24:45	1	56:26	1
55:55	1 +	90:87	2	25:23	1	56:95	1
56:30	1	91:15	2	26:10	1	57:24	1
56:55	2	91:90	1 +	27:15	2	57:87	2
57:23	2	92:21	1	27:39	1 +	58:18	1
57:60	1	92:68	1	28:05	1 +	58:50	1
59:40	1 +	93:46	1	28:37	1 +	58:72	1 +
59:87	2	94:99	1	30:95	1 +	59:51	1
60:30	2	95:09	1 +	31:10	2	60:50	1
60:81	2	95:46	1	31:51	1 +	60:97	1
62:84	2	95:83	1 +	32:00	1	61:24	1
64:17	1 +	96:30	1 +	32:16	1	61:70	2
65:44	1	98:07	1 +	32:53	1	62:00	1
66:39	2	98:40	1	32:84	1	62:47	2
67:10	1 +	99:02	1 +	33:45	1	63:00	1
67:75	2	99:14	1 +	34:42	2	63:50	1
68:85	1	2900:10	1 +	34:61	3	63:60	1
69:95	1	00:96	2	35:35	1	64:14	1
71:90	1	02:70	1 +	35:50	1 +	64:72	2
72:56	1	03:01	1	35:87	1	64:85	2
73:39	1	04:13	1	37:45	1 +	66:18	1
75:30	2	04:25	1 +	38:42	1	66:71	1
75:95	1	04:80	2	38:60	1 +	67:44	1
76:29	1	05:27	1	40:15	1	67:60	1
76:52	2	05:98	1	41:15	2	67:74	1
77:05	1 +	06:51	3	41:55	1 +	69:00	1
78:00	2	07:58	1	42:12	1	69:45	2
78:57	1	07:89	1	42:74	1	71:30	1 +
78:85	2	09:47	2	43:57	1	72:54	1
79:25	1 +	09:83	1	43:80	1 +	72:77	1
80:15	1	10:00	1	44:20	1	73:31	3
80:60	1	10:20	1	44:69	3	73:76	1
80:85	1	10:75	1	46:41	2	74:50	1
81:20	2	11:50	1	46:86	2	74:79	1
82:15	1	11:90	1 +	47:16	2	75:35	1
82:74	1 +	12:82	1 +	47:29	2	75:69	2
83:40	1 +	13:84	1 +	48:41	3	75:97	2
83:80	1 +	14:05	3	49:23	1 +	76:24	1
84:09	1 +	16:41	1	50:20	1	77:08	1

4	2	3003·15	1	3029·39	1	3053·77	1
0	1	03·56	1	29·95	3	53·83	1
2	1	03·87	2	30·23	1 +	54·15	1 +
2	1 +	04·30	1	30·52	2	54·47	1 +
0	1	05·65	1 +	30·95	1	54·79	1
6	2	06·06	1	31·31	2	55·97	1
0	1	06·35	1	32·65	1	56·44	1 +
6	1	06·55	1 +	32·95	1	57·08	2
9	1	07·15	1	33·30	3	57·25	1
1	1	07·65	1	34·60	2	57·55	1
1	1	07·85	1	34·83	1	58·89	1
3	1	08·25	2	35·20	1 +	59·59	1
3	1	08·93	2	36·81	3	60·10	2
5	1	09·33	1	37·16	1	60·40	1
3	1	10·13	1	37·50	2	60·77	3 d
0	1	10·59	1	37·90	1 +	61·48	2
2	3	10·88	1	38·40	4	61·60	1
1	1	11·27	1	39·25	1 +	62·29	2
5	1	12·41	2	39·55	1	62·70	3
0	2	12·73	1	39·90	1	63·33	1
3	1 +	13·49	1	40·39	2	63·56	1
5	2	13·60	1	41·38	1 +	63·90	1
9	1	13·81	1	41·77	2	64·15	1
0	1	14·16	1	42·20	1	64·35	1
8	2	14·40	1	42·35	1	64·67	1
3	1	14·77	1	42·60	1	65·26	2
5	2 d?	15·19	2	42·76	1 +	65·73	1
8	2	15·80	3	43·28	3	66·45	1 +
0	1 +	16·13	1	43·59	4	67·10	3
9	2	16·43	1	45·51	1 +	67·55	1
5	2	16·71	1	45·87	1	69·03	2
0	1	17·10	3	46·10	1	69·45	1
8	1	17·52	1	46·48	2	69·80	2
3	1	18·34	1	46·86	1	70·55	2
5	1	19·75	1	47·01	1	71·05	1 +
0	2	20·18	1	47·40	1 +	72·01	3
9	1	21·89	2	47·70	3	72·50	1
5	2	22·19	1	48·35	1	72·86	1
8	1	22·70	1	48·50	1	73·05	2
0	1	23·15	1	49·23	3	73·64	3
9	1	24·80	1 + br	49·74	1	74·11	2
5	1	25·55	1 +	50·15	1	74·55	1 +
0	1	25·74	2 Fe?	50·53	1	75·19	1
8	1	25·97	1 Fe?	50·72	1 +	75·31	1
3	1	26·30	3	51·37	1 +	75·60	1
5	2	27·46	1	51·59	2	76·00	1
0	1	27·70	2	52·40	2	76·48	1
9	2	28·60	1	52·83	1	77·00	2
5	1	29·03	1	53·28	1	78·44	2

Bogen

Dy

3078-80	3	3107-05	2	3128-83	1	3149-36	
79-42	2	07-40	1 +	29-38	2	49-60	
80-13	1	08-50	1 +	29-85	1	49-98	
80-40	1	08-95	1 +	30-25	2	50-27	
81-01	2	09-36	1	30-63	1	50-57	
82-62	2	09-62	1	30-87	1	50-75	
83-14	1	09-88	3	31-30	1	51-35	
83-55	1 +	10-40	1	31-62	1	51-63	
84-56	1	10-82	2	31-94	1	51-99	
84-77	1	11-30	1 +	32-21	2	52-33	
85-16	1	11-64	1	32-70	2	52-46	
85-69	1	11-90	1	33-10	2	53-42	
85-88	1	12-20	1	33-61	1 +	53-86	
86-49	1	12-98	2	33-91	1	54-16	
86-72	1	13-20	2	34-20	1	54-41	
87-61	2	13-54	1	34-40	1 +	54-67	
88-55	2	14-0	1 + br	34-60	1 +	54-77	
89-00	1 +	14-45	1 +	35-49	4	55-49	
89-55	1 +	14-88	1 +	35-79	1	56-63	
89-74	1	15-99	2 +	35-90	1	57-30	
89-87	1	16-50	1 +	36-10	1	57-65	
90-30	2	16-96	2	36-55	1 +	58-05	
90-65	1	17-59	3	36-79	2	58-30	
90-96	1	18-06	2	37-21	1	58-56	
92-01	1	18-23	1 +	37-65	1 +	58-96	
93-21	2	18-50	1	38-00	1	59-40	
93-56	1	18-73	1	38-25	1	59-80	
93-91	2	19-05	1	39-10	1	60-11	
94-63	1	19-55	1	39-60	2	60-63	
95-14	2	19-90	1	40-02	1	61-13	
95-81	3	20-28	3	40-15	1	61-48	
96-40	1	20-60	1	40-52	1	61-89	
97-00	2	20-86	1	40-78	3	62-65	
97-39	1	21-25	1	41-21	4	62-93	
97-71	1	21-50	1	42-04	1	64-20	
98-15	2	21-65	1 +	42-41	2	64-73	
98-65	2	22-07	1	42-72	1	65-02	
99-00	1	22-25	1	43-00	1	65-28	
3101-01	1	22-55	1	43-29	2	65-54	
01-47	1	23-09	2 d	43-92	3	65-77	
02-01	3	23-50	1	44-35	1	65-91	
02-30	2	23-71	1	44-65	1	66-42	
02-88	1	25-00	1	45-30	3	66-95	
03-34	3	25-36	1	46-25	3	67-55	
03-91	3	26-26	3	46-63	1	67-94	
04-20	2	26-87	2	47-03	2	68-24	
05-09	3	27-57	1	47-61	3	68-70	
06-15	1 +	27-70	1	48-26	1 +	69-05	
06-73	1	28-50	3	49-19	1	69-23	

3169·67	1	3191·72	1	3219·66	2	3245·78	1 +
70·11	4	92·35	1	20·57	2	46·00	1
70·86	2	93·11	2	21·62	3	46·30	1
71·07	2	93·40	3	21·75	2	46·82	1
71·66	2	93·79	1	22·00	1	47·05	1 +
72·20	1	93·98	1	22·96	1	48·48	3
72·54	1	94·52	1 +	23·40	3	49·03	1
72·77	1	94·92	1	23·95	2 +	49·54	2 +
73·15	1	95·60	1 +	24·20	1	50·08	1 +
73·98	1 +	96·05	2	25·21	3	50·67	1 +
74·14	1 -	96·54	2	25·49	1 +	51·15	2
74·45	1 +	97·10	1 +	26·10	4 d?	51·43	8
75·00	3	97·69	1	26·50	2	52·01	3
76·20	1 +	98·30	1 +	27·18	1 +	52·34	3
76·46	1	98·89	1	27·55	1	52·76	1
76·83	1	99·34	2	27·84	2	53·10	1 +
77·33	1	3200·01	1 Ti?	28·27	1 +	53·35	1 +
77·64	2	01·00	1	28·68	1 +	54·05	2
78·00	4	01·40	2	29·10	3	54·64	2
78·48	3	01·74	2	29·46	3	55·37	1
79·13	2 +	02·34	2	30·05	3	55·82	1
79·45	2	02·65	2	30·43	2	56·42	4
80·83	1	02·95	1	31·45	1	57·37	2
81·20	1	03·96	1	31·80	1	57·51	2
81·38	1	04·45	2	32·25	2	58·15	1
81·71	1	05·06	1	32·75	3	58·44	1
82·05	2	05·59	2	33·53	2 +	58·80	1
82·57	1	06·51	3	34·20	2 +	59·04	1
82·80	1	06·85	2	34·62	2	59·47	1
83·28	2	07·21	3	35·20	2	60·12	3
83·67	1	07·46	1 +	36·00	8 r	60·84	3
84·04	1 +	08·46	1	36·76	4	61·13	1
84·34	2	08·93	3	37·20	2	61·37	2
84·64	1	09·38	2	38·31	2	61·75	1
84·86	3	09·84	1	38·83	2	62·15	2
85·55	1 +	10·11	1	39·18	1	62·40	2
86·06	1	10·41	1	39·70	1	63·10	2 +
86·48	3	12·12	2	40·14	2	63·30	2 +
87·33	1	12·53	1	40·50	1	63·72	1
87·78	3	12·78	2	40·92	3	64·02	1 +
88·48	1	13·26	2	41·42	1	64·45	2
88·78	2	13·80	1 + d	42·10	1	64·89	2
89·17	2 +	14·72	3	42·60	1	65·31	2
89·89	2	15·30	4	43·20	2 d?	65·70	2 d?
90·25	2	16·31	1	43·85	3	66·15	3
90·76	1	16·72	5	44·27	1	66·35	3
90·96	1	17·23	1 Ti?	44·45	1 +	66·76	1
91·34	1	17·66	1	44·89	1	67·91	2
91·61	1	18·90	1	45·22	4	68·24	1

3268.45	1	3292.79	1	3318.59	1	3345.00	1 +
68.75	1	94.00	3	18.87	1 +	45.51	1
69.26	4	94.43	1	19.54	1	45.91	1
69.72	1	94.81	2	20.01	10	46.29	1
71.10	1	95.10	2	21.20	2	46.80	1
71.50	1 +	95.35	1	22.01	1	47.35	1 +
71.82	1	96.06	2	23.04	2 +	47.93	4
72.21	3	96.47	3	23.41	2	48.15	1
72.90	3	97.02	1	23.85	1 +	48.90	1
73.15	1	97.35	1	24.03	1 +	49.06	1
73.76	1	97.77	3	24.35	2 +	49.51	3
74.39	1	98.40	2	24.98	1 +	50.42	1
74.75	1 +	99.30	2	25.40	1 +	50.80	1
75.10	1	99.98	1	25.70	1 +	51.11	1
75.90	2	3301.04	2	26.31	3	51.90	1
76.05	2	01.65	1	26.60	2	52.34	1
76.35	1	01.85	1	27.19	2	52.82	3
76.88	1	02.20	2	27.45	2	53.36	1 +
77.21	1	02.62	3	28.90	2	53.72	4
77.74	2	03.31	1 +	29.60	1 + Ti?	54.30	1 +
78.00	1	03.77	2	30.00	1 +	54.80	1
78.45	2	04.17	1	30.34	1 +	55.20	2
79.03	1	04.45	2	30.70	2	55.75	1
79.61	2	04.86	2	31.35	3	56.35	2
79.83	3	05.61	8	32.18	2 + Mg?	56.60	1 +
80.20	4	06.36	4	32.87	1	57.30	1 +
80.79	1	06.91	1	33.18	1	57.45	1
81.77	3 +	07.60	1 +	33.66	1	57.76	1
82.18	1	08.00	1 +	34.21	3	58.08	1
82.62	1 +	08.20	1 +	34.55	2	58.41	3
82.93	4	09.00	10	34.90	1	58.75	3
83.20	1	09.56	1	34.99	1	59.10	1 +
83.80	2 + d	10.01	1	35.60	1 + d	59.61	3
84.15	1	11.10	2	35.99	2	60.28	1 +
84.50	3	11.41	1	37.27	1 + d	60.40	1 +
85.02	2 +	11.65	2	37.81	1 +	60.80	1
85.60	1	12.45	1	38.40	1	61.04	1
85.80	1	12.85	4	38.70	1	61.35	2
86.27	2 + br	13.12	1	38.79	1	61.80	1
86.74	2	13.30	1	39.63	3	62.01	1
88.10	3	13.44	2	40.74	1	62.33	1
88.80	3	14.01	1 +	41.13	4	62.73	1
89.30	2	15.09	2	41.56	2	63.56	2 d?
89.50	2	15.57	1	42.01	3	64.50	2 +
90.11	1 +	15.87	1	42.79	2	64.79	1 +
90.40	1 +	16.43	4	43.25	1	65.18	1 +
90.69	1	17.23	3	43.60	1	65.95	3
91.29	3	17.78	1 +	44.00	1	66.35	1
92.27	1	18.28	2	44.60	1 +	66.84	1

7-35	1	3393-10	2 +	3418-28	3	3448-22	1
7-69	2	93-53	1	19-75	5	48-65	1
8-27	4	93-70	8	20-13	1	50-03	3
7-73	1	94-14	2	20-94	1	50-36	1
7-45	1	94-99	1	21-20	1	51-85	1 + d
7-78	2	95-65	1 +	21-47	2	53-25	1 +
7-23	1	96-30	8	21-78	1	54-50	10
7-54	1	97-05	1 +	22-20	1	54-69	3
7-00	3	97-52	1	22-50	1 +	55-23	1
7-35	1 +	98-14	1	22-68	2	56-15	1 Nh?
7-89	4	98-50	2	23-01	2	56-70	5
7-22	1	98-98	1	23-39	2	57-32	1 +
7-45	1 +	99-51	2	23-90	1 +	58-55	1 +
7-92	3	3400-55	1	25-19	4	58-70	1 +
7-43	2	01-07	1	25-52	1	59-14	2
7-01	1	01-41	1	25-73	1 +	59-51	2 +
7-89	2	01-81	1	26-24	1	60-21	2 +
7-15	2	02-12	2	26-64	1 +	60-55	2
7-48	2	02-36	1	27-80	1	60-78	1
7-77	2	02-59	1	28-60	1	61-12	5
7-01	1	02-89	1	29-17	2	61-88	1 +
7-24	3	03-00	1	29-59	3	62-11	1 + d
7-34	2	03-40	2	30-35	1	63-51	2
7-55	2	03-60	2	30-59	1	64-03	2
7-00	2	03-91	1 +	30-89	1	64-60	1
7-03	1	04-75	1	31-93	3	65-48	2 +
7-30	1	05-10	3	32-35	1	65-70	2 +
7-70	2	05-80	3	32-71	3	66-30	1 +
7-06	1	06-95	3 +	32-98	2	67-23	1
7-60	1 +	07-30	3	34-51	8	67-66	1
7-31	1	07-90	5	35-00	1	68-00	2
7-25	3 d	08-27	3	35-39	2	68-59	4
7-18	10	09-30	1	35-60	1 +	68-94	1
7-78	1	09-60	1	36-05	2	70-04	1
7-11	3	10-35	1 +	36-21	2	70-34	2
7-03	1	10-86	2	37-06	2	71-29	4
7-66	1	11-40	2	37-55	2 + br	71-70	3
7-33	1	11-65	2	38-95	1 +	72-10	1
7-00	1	12-61	1 +	39-10	3	72-36	1
7-00	4	13-91	5	39-48	2	73-10	1
7-00	2	14-45	1	41-07	4	73-46	1
7-1	1	14-95	3	41-59	4	73-86	3
7-5	1 +	15-36	1	42-68	1	74-45	3
7-7	1	15-53	1	43-60	1	74-85	1 +
7-4	1	15-84	2	44-39	1	75-50	1 + br
7-3	4	16-57	1 +	45-72	10	76-51	1
7-5	1	17-30	3	47-10	5	77-22	5
7-1	3	17-71	1	47-40	2	77-67	1
7-2	2 +	17-79	1	47-92	2	78-06	2

3478:35	2	3503:80	1 +	3529:15	2	3564:34	3
78:65	2	03:98	1 +	30:68	1	65:81	1
78:93	1	04:27	1 +	31:14	1 +	66:19	1 +
79:91	1	04:64	4	31:87	20	66:97	1 +
80:57	2	05:06	1	32:61	1	68:15	1
80:97	2	05:30	1	34:15	1 +	68:50	1
81:79	1 +	05:60	4	34:60	2	69:45	1 +
82:24	1	05:97	2	35:11	10	69:78	2
82:90	1	06:15	1	35:30	1	70:63	1 +
84:33	1 +	06:40	1	35:74	1	71:13	1
84:80	3 d	06:93	4	36:20	15	71:54	1
85:55	1	07:67	1 +	36:71	2	71:80	1
86:05	2	09:19	1 +	37:81	2	73:16	1
86:30	1 +	09:55	1 +	38:70	15	73:45	1
87:08	1	10:22	1 +	39:50	3	73:97	4
87:35	2	11:15	2	39:76	2	74:31	4
87:72	3	11:53	1 +	40:83	2	74:76	1
88:40	1 + d	11:84	2	41:94	1	76:15	1 +
88:99	2	12:70	1	42:48	5	76:40	5
89:10	2	12:82	2	42:99	1	77:02	5
89:65	1	14:00	1	43:90	1	78:11	3
90:01	1	14:26	1	44:35	3	78:71	1
90:55	1	14:45	1	44:47	3	78:97	1
90:79	2	14:96	1	45:46	1 +	79:27	1
91:07	1	15:25	1	45:90	1 +	79:57	1
91:40	1	15:78	1 +	46:99	8	80:16	3
92:65	1	15:90	1 +	47:69	2	80:78	1 +
93:17	1 +	17:16	1 +	48:05	1	82:17	2
93:41	1 +	17:42	3	48:33	3	84:56	3
94:28	3	17:72	1 +	48:85	2	85:20	5
94:63	10 r	19:90	2 +	49:37	2	85:90	4
95:56	1	21:17	1 +	50:37	15	86:24	3
96:49	3	21:30	2	51:30	2	87:50	1
96:85	1	22:04	1	51:74	5	90:20	3
97:26	1	22:43	1	52:10	1 +	90:80	3
97:95	3	23:02	2	53:31	2	91:56	4
98:84	3	23:33	1 +	54:99	1	91:96	3
99:09	3	24:18	15	55:40	1 + d	92:25	3
99:75	1	24:77	2	55:79	1	93:29	2
3500:00	2	25:06	2	56:10	2	93:84	1
00:07	1	25:90	2	57:75	2	94:16	1
00:64	1	26:76	1	58:33	4	94:42	1 +
01:57	3	27:03	1	59:41	3	94:71	2
02:00	2	27:24	1	59:67	1 +	95:19	4
02:25	2	27:80	1 +	60:25	3	95:40	2
02:76	1	28:15	1	60:53	1	96:20	3
02:98	1	28:30	1 +	62:83	1	96:63	1
03:31	2	28:61	1	63:26	5	97:43	2
03:50	1 +	29:03	1	63:80	4	98:10	2

3598:40	2	3632:89	2	3671:82	2	3710:21	3
3600:49	5	33:15	2	72:43	4	10:89	1
01:50	1 +	33:40	1 +	72:83	3	11:80	2
02:97	2	33:90	1	73:29	3	13:99	2
03:30	2	34:45	2 +	73:98	1	15:45	2
03:85	1 +	35:40	3	74:22	5	15:70	1
04:50	1	36:87	2	74:60	2	17:10	2
04:98	1	37:42	3	75:26	1 +	17:43	1
05:25	1	38:65	1	75:77	1 +	18:27	1
05:45	1 +	39:03	1	76:18	1	18:82	1
06:27	5	40:01	2	76:71	8	19:00	1 +
06:50	1	40:39	4	77:40	1 +	19:58	1
07:05	1	40:94	1	78:18	1	20:92	1
07:33	1 +	41:21	1	78:64	3	21:82	2 +
07:82	1 +	42:80	1 +	79:39	1	22:85	1 +
08:22	1	43:66	1	80:70	1 +	24:58	4
09:40	2	44:05	3	81:06	1	25:00	1 +
11:35	1	45:55	10	82:21	1	25:60	1
12:05	1 +	46:00	3	82:54	1	26:05	1
12:44	1 +	46:74	2	85:00	2	26:34	1 +
12:89	2	47:02	2	85:90	3	26:70	1 +
13:20	2	47:70	1	88:45	1 +	27:30	1 +
14:20	3	48:55	2	89:18	1 +	28:12	2
14:83	1	48:91	3	89:68	1 +	28:89	1
15:10	1 +	50:16	1	90:70	1 +	29:35	1
16:19	1	51:00	1 +	91:33	1 +	30:75	2
16:48	1	52:45	1	93:10	1 +	30:97	1 +
17:30	2	54:00	1 +	93:66	1	31:24	1
17:74	1	54:30	1	93:99	2	31:55	1
17:86	1	55:00	1	94:50	2	32:28	1 +
18:21	2	55:76	1	94:92	8	33:50	2 + br
18:61	3	56:52	1 +	95:76	1	34:51	2
20:10	2 +	56:98	1 +	97:05	2	36:10	1 +
20:31	3	58:0	1 + br	97:40	2	37:75	1 +
20:70	1	58:61	1	97:70	1 +	37:95	1 +
22:24	1	58:83	1 +	98:04	1	38:45	1
22:73	1	60:05	1	98:31	3	38:74	1
22:90	1	60:80	1	99:11	1	39:49	3
23:52	1	61:23	1 +	3700:72	3	40:00	1
24:40	3	61:40	1 +	01:76	3	40:20	3
25:09	1 +	61:90	2	02:95	1 +	40:65	1 +
25:85	1 +	64:80	3	03:35	1 +	41:33	2
26:90	1 +	65:11	1	04:01	1 +	42:00	1
28:15	1	65:35	2	05:96	1	42:47	1 +
28:70	1 +	65:55	1 +	06:55	1 +	43:19	1
29:55	4	66:46	1	06:92	1	44:00	1 +
30:38	5	66:99	3	07:55	2	45:23	1 +
30:60	2 +	68:70	1 +	07:72	3	47:98	4
31:30	1	69:54	2	08:36	3	48:20	1 +

3748·65	1	3783·76	2	3820·03	1 +	3865·60	2
48·90	1	84·12	2	21·60	2	66·70	3
50·48	2	84·80	1 +	22·00	2	67·98	2
51·93	2	85·27	1	22·70	3	68·59	3
52·98	1 +	85·58	2	24·15	1	68·93	3
53·61	3	86·34	8	25·80	3	69·25	1
53·91	4	87·00	1	26·09	2	69·55	2
54·90	1	87·40	2	27·20	1 +	69·98	3
55·27	1 +	87·87	1	28·35	1	70·76	1 +
55·50	1 +	88·60	4	28·59	1 +	71·10	1 +
56·20	1 +	90·13	1 +	29·90	2	71·77	2
57·20	3	92·02	3	31·20	2	72·29	10
57·52	4	93·40	1	31·77	2	72·79	1
59·11	1	93·66	1	33·00	2	74·11	4
60·20	1	94·40	1	33·69	1 +	74·75	2
60·97	1 +	95·59	1	34·70	1 +	75·10	1
62·88	1	96·16	1 +	35·13	1 +	75·30	1
64·46	1 +	96·98	1 +	36·65	10	76·08	1 +
65·02	2 +	97·40	1 +	38·05	1 + br	76·27	1
65·40	1 +	97·90	1 +	38·80	2	76·64	2
66·13	1 +	98·42	2	39·67	1	77·40	1 +
66·38	1 +	98·86	1	39·92	1	77·65	1
67·79	3	99·17	1	40·66	1	78·09	2
68·20	1 +	3800·03	2 +	41·01	3	79·20	4
68·70	1 +	00·60	2 +	41·42	4	81·0	1 + br
69·18	1 +	02·08	2	42·11	2	81·60	1
69·55	1 +	02·83	1	43·17	1	82·11	3
69·85	1 +	03·75	1 +	44·48	2	82·90	1
70·31	1	04·30	3	45·28	1 +	83·20	2
70·79	1	04·55	1	46·48	3	83·44	1
71·22	2	06·00	1	47·15	2	86·00	1 +
71·53	1 +	06·41	3	48·51	1	86·50	1 +
72·50	1 +	07·65	1 +	49·52	3	87·67	2
72·80	1	08·05	1	50·19	1	88·20	1
73·20	3	09·18	2	50·63	1	88·55	3
73·48	2	09·60	1	52·19	1	89·14	3
73·85	1	09·93	2	53·17	4	89·90	1
74·90	2 d	10·10	1	55·05	1	91·15	1 + Nh?
77·06	1	10·45	1	55·75	1	92·06	3
77·61	2	11·00	1 +	57·61	1	93·03	3
78·20	1 +	12·42	3	58·23	2	94·67	1
79·17	1	13·27	2 +	58·54	2	95·50	3
79·39	2	13·80	3	59·37	1	96·02	1
79·78	1 +	14·75	1	59·74	1	96·32	1
80·44	1 +	16·36	2	60·00	1	96·78	1
81·10	1	16·89	8	62·81	2	98·70	10
81·61	2	17·60	2 +	63·35	2	99·30	1
82·30	1 +	18·90	2	64·20	2	3900·00	1 +
83·03	2	19·59	1	64·99	1 + d	00·54	1

24	1	3940.87	1+	3976.35	1	4019.55	1
3	1+	42.22	1+	78.73	10	19.70	1
4	1	42.65	4	79.60	3	21.03	2
5	1	44.83	20	81.54	1	23.29	1
3	2	45.42	1	82.10	8	23.85	2
1	1	45.77	1+	82.66	1	24.60	1
5	1	46.05	1	83.83	10	25.02	1
5	1+	46.49	1+	84.39	4	25.75	1
6	1	47.07	3	84.85	2	27.91	3
9	1	48.73	1	86.20	1+	28.52	4
0	1	49.40	1+	87.21	2	29.56	1
6	1	49.85	1	87.71	1	31.23	1
5	1+	50.52	4	88.37	1+	32.62	4
5	1	51.36	1	89.06	2	32.99	2
5	1+	51.47	1	90.50	2	33.81	4
6	1	51.90	1	90.96	1	36.48	3
0	2	52.25	1	91.50	3	37.52	1
6	2	52.63	1	92.04	1	37.78	1
0	2	53.26	1	93.50	1+	38.65	3
9	4	53.63	1	93.76	2	38.97	2
0	4	54.15	1	94.49	1+	40.40	1+
8	4	54.68	3	94.70	1	41.17	1+
1	1	55.25	1	95.50	1+	42.11	3
8	2	55.60	1+	95.90	1	43.55	1+
8	2	56.39	1	96.16	1	45.40	1
9	1	56.95	1	96.90	10	46.16	20
0	1+	57.36	1	98.25	1	47.56	1
8	4	57.93	4	4000.02	1	47.87	1
0	2	58.59	1	00.69	20	48.50	2
5	1+	58.99	1	01.25	1	49.05	2
0	1	59.51	2	01.71	1	49.51	2
5	1	59.85	1	04.48	1	50.73	10
2	3+(Fe)	60.97	1	04.60	1	51.99	1
3	2	61.90	1+	06.00	2	52.55	1+
5	1	62.71	3	06.25	2	53.33	1+
0	3	63.30	1	07.30	1+	53.50	1+
1	2	63.95	2	07.92	2	54.02	1+
9	5	64.85	1	08.64	1+	55.28	3
2	3	65.25	1+	10.23	2	57.54	2
4	2	65.97	1+	11.46	3	60.71	1
3	2	66.50	1	12.70	1	61.70	1
7	2	67.65	2	12.99	1	63.47	1
4	1	68.56	20	14.00	2	65.30	1
2	2	70.13	1	14.87	3	65.52	1
0	1	71.31	2	15.33	1	66.95	1+
5	3	71.77	1	17.00	1	68.70	1+
0	2	72.54	2	17.20	1+	69.85	1+
3	1+	73.45	1+	17.93	1	70.30	1+
9	1+	74.03	2	18.62	1	71.20	1

4072·80	1	4120·81	1 +	4166·0	1 + br	4218·24	10
73·30	8	21·90	2 +	66·39	1	18·73	1
74·17	1	22·51	1	67·40	1	21·30	15
77·05	1	24·82	5	68·15	20	22·38	3
77·50	1 +	26·29	2	69·23	1 +	24·83	1
78·14	20	28·45	3	69·40	1 +	25·31	10
79·40	1	29·30	2	70·50	1	30·40	1 +
79·76	1	29·61	5	70·70	1	31·00	1 +
81·97	1	30·53	2	72 11	3	31·25	1 +
82·17	1	31·20	2	76 80	1 +	32·19	4
83·24	1	33·00	2	76·97	1 +	33·13	1
83·98	1	33·52	3	78·75	1	33·60	1
84·45	1	34·01	3	81·14	1	34·30	1
85·29	2	34·31	2	81·41	1	34 99	2
85·50	3	34·90	1	81 76	1	36·40	1
85·90	1	36·35	1	82 10	1	36·74	1
87·34	3	37·09	1	82·57	2	37·70	2
87·96	1	37·52	1	83·85	10	38·20	1
89·65	1	38·70	2	86·60	1 +	38·60	1
90·10	1	39·70	2	87 00	20	40 02	5
90·61	1	41·67	4	88·49	1	43·59	1
91·68	2	43·28	10	89 09	1	44·95	1
91·92	2	43 86	1	91·10	2	46·09	5
93·81	1	45·78	1 +	91·80	8	47·52	4
94·50	1 +	46·22	8	94·00	1	48·60	2 +
96·27	3	47·30	1 +	95·01	10	50·57	1 +
96·84	1	48·15	1	95·39	3 +	50·99	1
97·00	1 +	49·10	1 +	96·75	1 +	51·45	1 +
99·01	1	49·99	1	97·52	1	51·90	1 +
99·40	1 +	50·54	1 +	98·18	5	52·53	1 +
4100·05	1	51 02	1	99·19	1	52·97	1 +
01·58	1	52·60	3 +	4201·17	1	56·13	1 +
02·10	1	53·30	2	01·48	5	56·49	8
03·50	15	53·52	1 +	02·39	4	57·88	1 +
04·06	4	54·38	2	04·15	1	58·30	1
05·20	3	54·70	1	05·21	3	58·77	2
06·00	1 +	55·93	1	05 83	1 +	59·40	1
06·14	1 +	56·55	1 +	06·69	4	61·37	1
06·54	1	57·14	1	07·38	1	61·76	1
86·85	1	58·02	1 +	07·83	2	63·10	1
07·34	1	58·20	1 +	08·52	1 +	63·70	1
07·60	1 +	58·65	1 +	11·40	3	64·95	1 +
11·51	10	59·49	2	11·89	30	65·99	2
13·20	2	60·39	2	13·32	8	66·30	1
14 24	2	62·39	2	13·76	1	66·70	1
14·84	1 +	63·19	1	14·54	1	68·08	1
15·55	1 +	63·96	1 +	15·30	10	68·45	2
18·17	1 +	64·70	1 +	16·02	1	69·20	1 +
19·48	3	64·90	1 + br	17·10	1 +	69·73	2

1 +	4316·91	1	4366·28	2	4419·10	1
1	18·10	1	66·90	2	20·48	1
1	19·15	1	67·35	1	21·86	2
3	19·48	1	68·45	1	22·95	1
1	22·35	1	68·77	1	23·78	1 +
1	22·71	2	69·76	1	26·00	1
1	23·92	2	70·26	1 +	26·35	1
2	24·80	1 +	71·47	1	27·03	2
1	25·29	3	74·42	3	31·18	2
3	26·04	2	74·98	3	32·79	1
1 +	26·55	2	75·49	3	35·95	2
1 +	26·94	1	77·58	1 +	36·82	1
2	28·10	2	78·51	1	38·55	1 +
1	29·08	3	79·00	1	38·78	1 +
1	30·03	2	80·40	2	39·30	1
1	33·10	1	80·66	1	40·32	1
1	33·87	1	81·36	1	43·01	1
1 +	34·23	1	82·15	1	44·03	1 +
1 +	34·52	1	83·34	1	44·45	1
1 +	34·78	1	84·49	2	44·80	3
2	35·45	1	85·44	2	45·19	1
1	35·84	1	86·14	1	46·33	1 +
3	36·17	1	86·99	1	48·40	2
1	37·65	2	89·95	2	48·81	1 +
8	38·43	1 +	95·14	3	49·33	2
1	39·81	3	96·24	1	49·91	10
1 +	40·59	1	97·03	1	52·60	1
1 +	41·15	1	97·64	1	53·10	1 +
1 +	44·42	1	98·00	1	55·80	3
1 +	44·75	1 +	98·27	1	60·10	1 +
1	46·52	3	98·67	1	60·46	1
1	47·87	4	99·20	1	61·35	1 +
3	48·54	1	99·85	2	62·55	1 +
1	49·25	1	4400·27	2	63·03	1 +
1	54·30	1 +	02·30	1	63·50	1 +
1	54·50	1 +	02·91	1	64·35	1 +
1	55·50	1	03·73	1	64·93	1 +
10	56·32	1	04·12	1	65·49	1
1	56·92	1	05·75	2 +	65·96	1
1	57·33	1	07·33	1	66·47	1 +
1	58·67	4	07·71	1	67·63	1 +
1	60·40	2	08·22	3	68·05	2
1	61·53	2	09·59	8	68·31	3
1	62·45	2	11·16	1	69·08	1
1	63·10	2	11·54	1	70·79	1
2	63·50	1 +	12·90	1 +	71·30	1
1	64·23	2	16·05	1 +	71·68	1
1 +	64·45	2	16·63	1 +	72·31	1
1	65·80	1	18·28	2	73·72	1

4474·75	1	4516·10	1	4555·2	1 + br	4604·51	1 +
75·66	1	17·10	3	55·41	2	06·23	2
76·80	2	18·70	3	56·66	2	09·25	1
77·32	1	19·14	1	57·6	1 + br	10·71	1
77·69	1	20·00	2	58·34	2	11·10	1
79·29	1	20·9	1 + br	59·80	1	11·86	1
79·70	2 +	21·8	1 + br	60·30	1 +	12·46	10
80·85	2	22·85	1	62·60	1 +	13·65	1
82·15	2	23·20	1	63·70	1 +	14·01	2
82·50	2	23·68	1 +	65·30	4	14·99	2
83·63	1	24·15	1 +	66·41	1	15·74	2
84·55	3	24·95	1 +	66·76	1	17·05	1
85·24	1	25·27	2	67·27	2	17·42	3
86·40	2	26·00	1	67·71	1	18·92	1
87·37	1 + br	26·26	2	68·60	1	20·19	4
88·02	1	27·09	1	69·65	1 +	20·50	1
88·36	1	27·42	1	69·98	1 +	21·15	1
88·71	2	27·80	2	70·5	1 + br	21·60	2
90·63	1	27·94	3	71·79	1	22·52	2
91·21	1	28·52	1	72·54	1	24·30	2
91·52	1	29·97	1	74·03	3	24·60	2
92·31	1	30·66	1	74·50	1 +	26·19	1
93·27	1	31·76	2	76·79	3	27·09	1
95·23	1 +	32·7	1 + br	78·00	8	27·30	1
95·97	1 +	35·05	1 + br	78·73	1 +	27·63	1
96·25	1	35·53	1	79·6	1 + br	28·28	2
96·57	2	36·30	1 +	81·6	1 + br	29·30	1 + br
97·80	1	36·88	1 +	83·24	2	31·70	2
98·63	2	38·36	1	83·55	1	34·96	1
99·13	1	38·93	3	83·83	1	35·50	2
99·45	2	39·31	1	84·10	1	35·79	1
4500·10	1	40·45	1 + br	84·46	1 +	36·40	1
00·44	1	41·87	3	85·90	2	37·30	2
02·77	2	42·59	1	86·17	2	37·79	2
03·41	4	44·30	1 +	86·38	2	38·70	1
05·80	1	45·52	2 +	86·82	2	39·00	2
06·25	1	46·65	1 +	88·10	3	40·25	1
07·11	2	46·99	1 +	88·49	1	42·43	1
07·98	1	47·63	1	89·53	15	42·96	1
08·29	1	50·17	1	90·23	1	43·63	2
10·10	1 + d	50·70	1	90·75	2	44·30	1
10·70	1	51·08	2	91·95	3	44·76	1 +
11·05	1	51·54	1	95·31	2	46·90	2
11·82	1	51·85	1	96·93	1	47·47	2
11·96	1 +	52·43	1	97·67	1 +	49·00	1
12·38	1	53·00	1	99·48	1 +	49·65	1
13·77	1	53·33	2	4600·04	2 +	50·36	2
15·22	1	53·85	1	00·87	1	51·72	3
15·73	1	54·45	1 +	02·71	1 +	53·61	1

3	2	4698·89	4	4764·55	1 +	4820·90	1
0	1	99·53	1 +	64·90	1 +	21·50	2
0	1	4701·30	1 +	66·65	1 +	22·13	1
6	2	01·49	1 +	67·35	1 +	23·00	1
0	1 +	02·30	1 +	69·82	2	23·90	2 +
9	2	02·90	1 +	71·00	1 +	24·40	1
9	2	03·64	3	72·12	3	25·18	3
2	1	05·90	1 +	73·40	1 +	26·75	2
8	1	06·94	2	73·95	1 +	27·30	1 +
1	2	08·00	2	74·55	1 +	29·10	2
5	1 +	09·40	2	75·03	2	29·33	1
0	1	11·28	1	76·01	4	29·87	2
4	4	11·81	1	77·10	1 +	31·06	1
0	1 +	12·72	1	79·60	1 +	32·25	1
3	2	14·99	1	80·40	1 +	32·60	3
0	2	17·08	1	81·24	1 +	33·45	1
9	1	18·8	1 +	82·05	1 +	33·94	2
1	1	19·05	1	83·67	1 +	37·15	1
4	2	21·42	3	84·80	1 +	37·88	1
3	1	23·34	1	85·11	2	38·57	1 +
7	1 +	24·10	2	85·50	1	39·80	1 +
0	2 +	24·41	2	86·50	1 +	40·34	1
9	3	26·50	2 d	87·14	4	40·65	2
7	1	26·95	1 d	91·50	3	41·98	2
0	2 +	27·32	3	92·15	1 +	42·35	1 +
0	3	28·60	1 +	93·10	2 +	43·63	1
0	1 +	29·10	2	95·10	1 +	43·96	1
0	1 +	29·30	1 +	97·83	1	45·03	1
0	1 +	32·01	5	98·55	1 +	45·90	1
8	1	32·30	1	4800·86	3	51·65	2
0	1 +	34·6	1 + br	02·25	1 +	52·70	2
0	2	34·8	1 + br	02·75	1	55·69	2
0	2	38·68	1	03·75	1	56·42	2
0	1 +	41·10	2	04·73	2	57·50	1 +
0	2	41·70	2	07·19	1	59·20	1 +
0	1	42·60	1 +	08·14	2	59·35	1 +
0	1	42·90	1 +	08·95	1	60·24	1
0	1 +	43·21	2	10·47	2 +	60·87	1
0	3	45·99	3	11·00	1	61·54	1
0	1	48·4	1 + br	12·92	4	61·92	1
0	1	52·5	1 + br	14·35	1	62·26	1 +
0	2	54·22	1	16·39	1	65·05	1 +
0	1	55·18	2	16·73	1	65·30	1 +
0	2	56·86	2	17·22	1	65·87	2
0	1	57·63	1	17·66	1	67·94	1
0	2	60·21	4	18·39	1	68·24	2
0	1	61·5	1 + br	19·22	3	69·83	1
0	1	62·55	1 +	20·27	1	72·65	1
0	1 +	64·0	1 + br	20·50	1	73·34	2

4874:00	1	4932:65	1	4999:19	1	5092:41
74:77	1	33:10	1	5000:29	1 +	5100:01
75:65	1	34:03	2	02:97	1	02:24
76:11	2	36:26	1	04:03	2	02:51
78:92	1 +	37:00	1	04:44	3	05:51
79:36	1 +	37:52	1 +	07:55	1	06:50
80:01	1	40:60	1	10:76	2	07:05
80:34	3	41:31	1	11:70	1	08:18
82:21	2	43:02	1	18:15	2	08:60
84:32	2	43:60	1 +	19:50	1 +	10:48
84:73	2	44:13	1 +	22:29	3	12:88
85:31	1	44:60	1 +	24:20	2	13:60
86:35	1	45:69	1 +	24:70	2	20:18
88:27	4	46:48	1	28:01	2	22:57
89:52	3	48:38	1	29:40	1	23:26
89:99	1	49:50	1	32:81	2	28:45
90:30	3	51:18	1	33:15	2	30:00
92:80	1	51:60	1	34:55	1 +	30:51
93:15	1 +	52:45	1 + d	37:08	1 +	31:20
93:88	3	53:53	1	37:90	1 +	32:10
96:04	2	54:51	1	39:23	1	32:37
97:31	1	56:90	1 +	40:37	1	35:19
97:54	1	57:59	30	40:71	1	36:45
99:41	2	59:20	1	42:20	1	39:71
4902:10	2	59:79	2	42:80	4	41:9
03:85	1	61:57	1 +	43:80	1	45:35
04:51	1	61:95	1 +	46:48	1	47:15
06:45	2	63:26	1	47:44	2	47:35
07:26	1	64:85	1 +	50:38	2	49:13
07:65	1	68:05	1 +	52:20	1	49:80
09:20	1	69:21	1	53:40	1	50:32
09:99	1	70:01	1 +	53:53	2	51:47
11:34	1	71:95	1	55:63	2	51:75
11:69	1	73:74	2	56:00	1	55:40
12:73	1	74:15	1	56:40	1 +	56:90
14:91	2	75:15	2	60:90	1	59:10
16:60	3	76:56	1 +	61:78	2	59:28
17:35	2	80:28	1	63:60	1	61:15
17:96	1	82:10	1	65:72	1	64:24
18:42	2	84:77	1	70:83	3	65:51
19:72	1 +	85:69	2	74:00	1 +	66:98
21:67	2	87:80	1 +	74:42	1 +	68:24
22:39	2	88:30	1 +	77:82	3	69:80
22:74	1	91:97	1 +	80:34	1	70:31
23:33	3	92:81	1 +	80:94	1	72:02
27:51	1	93:73	1 +	85:10	1 +	73:97
29:50	1	95:00	1	87:05	1 +	75:22
30:76	1	95:54	1	88:60	1	77:71
31:17	1 +	98:65	1	90:58	3	80:24

5184·62	1	5290·17	1 +	5407·96	1	5577·61	1 +
85·30	3	98·01	3	09·9	1 + br	83·40	1
85·78	1	5300·49	2	11·0	1 + br	92·55	1
87·16	1	01·05	1	16·76	1	97·60	1
88·65	2	01·77	5	18·94	1	5600·91	3
90·0	1 + br	06·83	1	19·32	3	05·86	2
93·06	8	09·20	3	20·95	1	13·47	2
97·02	1 +	10·24	1 +	23·50	3	27·74	1
97·84	3	12·02	1	24·47	2	30·00	1 +
99·70	1 +	12·81	2	25·45	1 +	34·97	1 +
5200·98	1 +	17·17	1	25·98	1 +	39·73	4
03·68	1 +	18·31	1 +	26·55	1	41·76	2
05·87	1	19·42	1 +	26·90	3	45·78	1
07·07	1 +	20·07	1 +	43·55	2	46·24	3
12·20	1	21·86	1 +	51·30	4	52·20	3
12·59	1 +	22·40	1 +	55·65	3	60·50	1 +
14·57	1 +	24·88	3	60·80	1	64·10	1 +
15·58	1 +	26·88	1	69·32	2	66·64	1
16·47	1 +	28·19	3	72·13	2	71·51	1
20·48	1	29·10	1 +	72·84	1 +	77·90	1
20·86	1	30·90	1 +	77·98	1 +	78·53	1
22·13	1	35·20	1 +	80·17	1 +	83·27	1 +
27·97	1	36·71	1	84·0	1 + br	85·78	1
36·39	2	36·96	1	90·5	1 + br	92·6	1 + br
38·51	1	37·60	2	92·0	1 + br	92·85	1 + br
41·05	1	40·49	3	97·04	1	94·7	1 + br
41·65	1 +	43·33	1	99·75	1 +	96·10	2
46·55	1	43·75	1	5502·99	1	98·92	2
47·10	1	45·75	1	06·75	2	99·60	2 +
47·87	1 +	47·79	1	08·55	1 +	5703·13	2
48·30	1	48·55	1	11·45	1 +	08·05	2
48·65	1 +	52·31	2	12·12	1 +	18·70	3
49·8	1 + br, d	56·35	1 +	15·61	2	26·01	1 + br
55·20	1 +	61·54	1	20·07	1 +	28·9	1 + br
58·55	1	68·40	2 +	28·25	2	33·18	1
60·07	2	69·46	2	30·78	1	40·45	3
60·75	3	70·80	1	32·35	1 +	45·79	3
67·30	2	71·68	2	34·60	1 +	50·75	1 +
69·71	3	73·20	1	35·48	1 +	53·9	1 + br
72·44	3	76·30	2	38·50	1	54·5	1 + br
74·29	1	80·87	1 +	42·43	1	58·49	1
75·50	3	81·55	1 +	47·49	3	59·04	1
77·55	1	82·04	1 +	59·34	1	60·05	1 +
78·05	1	85·02	1	62·70	1 +	67·20	1 +
78·52	1 +	85·82	2	63·40	1	5805·77	2 +
79·89	3	89·77	3	64·35	1 +	07·89	1 +
80·57	1 +	92·24	2	65·0	1 + br	32·25	1 +
82·22	3	95·75	3	66·55	1 +	35·1	1 + br
85·15	2	5400·11	1	68·35	1 +	40·5	1 + br

5845·57	1 +	5986·30	1 +	6259·31	5	6475·14	1 +
46·35	1 +	88·81	3	60·63	1	83·80	3
56·3	1 + br	6003·56	1 +	91·89	1	86·82	3
59·82	1 +	09·21	1	6317·46	1	6519·40	1 +
64·30	1 +	11·06	2	23·40	1 +	48·50	1
68·40	2	17·55	1	31·31	1 +	58·30	2
93·50	1 +	31·25	1	38·25	1 +	65·40	1 +
5902·72	1	58·45	1 +	43·52	1	79·62	5
05·48	1 +	85·30	1	87·11	3	94·45	1
09·40	1 +	88·49	2	96·87	2	6643·65	1
15·40	2	6127·37	1 +	6402·65	1 +	58·65	1 +
22·63	1 +	33·85	1 +	22·17	3	61·94	1
24·80	1	58·54	1 +	36·80	1 +	68·17	2
46·08	2	65·80	1 +	61·10	1 +	6748·20	1 +
64·75	2	68·67	2	68·80	1 +	6835·7	1 + br
74·75	3	96·50	1 +	72·24	1 +	99·70	1
85·14	1	6229·97	1				

XXII. Er. Erbium.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Ber. 119 IIa (1910) (Rot).

Material: Erbiumnitrat aus Oxid von Prof. P. T. Cleve, auf Gaskohle. Verunreinigungen: Ad, Tm, Nh.

Linienzahl: 2321.

2341·96	1	2509·16	1 Tm	2616·99	1	2677·69	1
43·59	1	14·03	1	21·23	1	79·64	1 Tm
45·20	1	35·06	1	21·85	1	88·50	1
54·30	1	37·09	1	24·30	2	2700·74	1
58·63	1	47·37	1	24·44	2 Tm	01·79	1
77·89	1	61·75	1 Tm	27·88	1	04·49	1
86·68	1	64·86	1	40·86	1 Tm	11·62	1
87·27	1	77·48	1 +	47·28	1 +	12·20	2
97·39	1	79·72	1	51·49	1	13·33	1
2400·45	1	81·73	1	53·81	1	16·65	1 +
20·39	1	86·86	2	54·19	1	21·25	1 Tm
25·36	1	87·15	2	55·34	1	21·66	1
26·29	1	87·45	1	57·07	1	24·75	1
27·40	1	92·66	1	60·18	1 Tm	26·30	2
46·47	2	95·15	1	63·55	1	30·17	2
60·80	1	2602·76	1	65·16	1	31·65	2
67·32	1	05·01	1	66·41	1	39·37	3
78·44	1	12·47	1	70·34	3	50·29	3
2503·55	1	14·65	1	72·34	3	51·02	1
07·71	1	15·50	1	75·45	2	52·78	1

68	1	2834.03	3	2897.62	4	2953.84	1
09	3	37.21	1	2902.74	1	54.46	1
73	4	38.82	3	03.55	1	55.72	1 d
50	1	40.75	2	04.59	8	56.55	1
81	1	40.94	1	06.60	2	57.05	1
73	2	41.45	1 Tm	08.62	2	59.00	1
49	2	42.01	1	09.67	3	60.25	1
13	3	42.50	1	10.49	8	62.25	1
74	1	44.77	1 Tm	11.15	2	62.46	1
06	2	45.95	1	11.52	1	62.63	2
69	1 Tm	46.36	1	12.93	1	63.82	2
30	1	47.13	1	14.77	1	64.02	2
67	1	48.15	1	15.44	1	64.36	1
15	1	48.45	3	15.72	3	64.64	5
22	1	49.00	1	18.95	1	64.95	1
34	1	50.75	2	19.35	2	65.33	2
06	2	55.50	3	20.34	2	65.98	2
15	1 Tm	58.65	2	22.55	1 +	66.28	1
22	2	59.93	3	26.46	1	68.05	1
53	1	60.35	1	26.83	2	68.55	1
81	2	62.70	1	27.45	1	68.89	4
55	1	66.47	1	27.81	2	70.18	2
30	1 Tm	69.33	3	27.90	1	71.08	1
27	1	70.65	1	28.35	2	71.38	1
97	1	71.78	1	28.52	2	71.74	1
73	1 Tm	72.95	1	29.38	3	71.85	1
37	1 Tm	73.14	1 Tm	29.82	2	72.40	3
63	1	73.91	2	30.75	2	73.86	2
82	1	74.47	1	31.67	1	74.32	1
63	2	74.88	2	31.76	1	74.58	3
96	2	77.36	1	32.46	1	75.55	1
65	1	78.63	1	32.67	1	75.80	3
46	2	79.00	1	34.60	1	80.05	1
85	2	79.34	1	34.71	1	81.58	1
47	1	79.47	1	36.10	1	83.17	2
57	1 Tm	82.71	1	39.40	1	83.33	2
96	1	86.20	1	39.55	1	83.89	2
44	1	86.59	1	41.27	1	85.62	1
94	1	86.95	1	41.41	1	88.32	1
30	3	87.18	2	41.80	1	89.37	2
55	1 +	88.25	2	42.30	2	89.66	2
45	1	89.10	1	44.16	2	90.64	2
00	1	91.45	1	45.14	1	93.35	1
00	1 Tm	91.50	1	45.37	3	94.19	1
46	1	93.63	1	46.71	3	95.55	1
53	1	94.04	3	48.90	2	96.15	1
30	1	96.05	1	49.33	1	96.46	2
90	1 +	96.68	1	50.17	1	98.00	1 +
16	1 +	97.08	4	51.37	2	98.15	2

3000-12	1 +	3054-52	3	3090-72	1	3129-02	1
02-06	1	55-05	1	92-05	1	30-13	1
02-51	4	56-17	1	92-27	1	31-19	2
02-76	4	58-30	1	93-25	3 r	31-37	5
03-46	1	58-73	1	93-90	2 +	32-14	2
03-92	2	61-42	2	94-39	1	32-60	3
05-15	1	61-77	2	95-39	1	32-87	3
09-54	1	62-34	1	95-95	2	33-38	1
09-76	1	62-85	1	96-27	1	33-99	3
10-39	2	62-94	1	98-69	2	35-70	2
11-25	2	63-45	1	99-30	3	36-39	1
12-55	3	64-96	2	99-71	2	36-87	1
13-85	1	65-10	2	3101-77	1 +	37-94	2
14-02	1	66-35	3	02-34	1	38-58	2
14-21	1	67-62	1	02-78	2	40-28	1
14-74	1	68-49	1	03-53	1	41-24	5
15-39	3	69-35	2	04-14	1	41-91	2
16-91	3	70-38	1	04-55	1	42-10	1
17-83	3	70-90	5	04-85	1	42-92	2
19-85	2	72-26	2	05-10	1	43-35	2
22-81	1	72-68	5	05-64	1	43-74	2
25-35	1 +	73-16	2 +	06-55	1	44-41	3
26-02	4	73-50	4	06-89	3	44-60	2
26-74	1	73-81	1	08-22	1	45-05	1
27-93	1	74-13	1	10-98	2	46-22	1
28-36	3	74-56	1	12-15	2	46-65	1
30-56	1	75-46	1	13-61	4	46-93	1
31-40	4	76-26	1	14-46	1	48-40	1
33-19	1	76-95	1 +	15-17	2	48-58	1
36-09	1	77-27	1	15-61	3	49-71	1
36-31	3	78-35	2	16-13	1 +	49-99	1
36-67	1	78-99	3	17-02	3	50-69	3 v
38-34	1	79-70	1	17-55	1	51-17	3 v
39-34	1	79-81	1	18-46	1	52-50	3
40-44	1 +	80-06	1	18-57	1 +	54-05	1
41-73	1 +	80-30	1	18-90	2	54-42	5
42-45	1 +	81-25	1	19-13	2	55-65	1
43-23	1	81-49	2	19-61	1	56-03	1
44-33	1 +	82-20	4	20-94	1	56-63	1 +
46-98	1	84-15	4	22-00	3	57-44	3
47-54	1 +	84-48	1	22-79	x	58-55	1
47-93	1 +	85-16	1	23-18	2	59-70	1
48-50	2	85-26	1	23-67	1	60-26	1
49-32	1	86-14	1	24-23	1 +	60-47	2
49-40	1	87-25	2	24-97	1	60-89	1
50-07	2	87-91	2	25-27	2	61-45	1
50-99	2	88-85	2	25-76	3	63-30	1 +
51-50	1	89-16	1	26-31	2	64-63	1
53-89	2	89-88	1	27-45	2	65-55	1

1	3210:70	1	3263:35	1	3302:58	3
2	11:40	1	63:57	1	04:09	3
1	11:58	1	64:25	1	04:20	2 +
2	14:57	3	64:91	5	05:22	3
1	15:37	1 +	66:76	3	07:60	2
2	17:94	1	67:23	4	08:84	1
1	19:10	1	67:51	1	09:03	1
2	19:87	1	68:35	1	09:95	2
3	20:90	4	68:55	1	10:74	2
1	21:81	1	68:94	1	11:25	1
1	23:47	3	69:10	1	11:69	1
1	26:25	1	69:54	3	12:60	10
1	27:29	3	72:24	1	13:65	2
2	30:07	2	72:49	1	13:83	2
1	30:26	2	73:22	1	14:56	2
1	30:72	8	73:50	2	15:08	2
1 +	31:14	1	74:53	1	16:20	1
2 +	31:40	1	74:90	1	16:51	3
4	31:65	1 +	75:56	2	17:00	1
4	32:18	3	75:82	1	17:58	2
3	33:52	1	76:19	1	18:35	2
3	34:45	1	76:95	2	18:91	2
1	34:94	1	77:50	1	19:26	1
2	35:55	2	77:83	2	19:68	1
1	36:95	2	78:32	3	19:89	1
1	38:10	4	79:48	5	20:00	1
1	40:36	3	80:38	5	23:37	5
2	40:64	3	81:36	1 +	27:04	1
1	41:66	3	81:85	1	27:73	1
1	43:40	3	83:02	1	28:45	1
1	43:60	2	83:53	2	29:45	1
1	44:95	1	83:88	1	29:82	3
1	47:63	2	84:15	1	31:22	1
1 +	48:61	1	85:73	2	31:70	2 + d
1 +	49:44	3	86:29	2	31:95	2
1	50:35	1	86:88	3	32:86	4
3	50:98	1	88:10	2	33:01	2 +
1	51:76	1	89:49	3 Ad	33:96	1
1	54:97	1 +	89:99	1	34:45	1
1	55:92	1	90:20	1	35:02	1
2	56:49	2	90:81	1	35:46	1
2	56:83	1	91:14	3	35:56	1
1	57:90	1	91:42	2	36:62	1
1	58:18	2	92:45	1	36:91	2
1	58:64	2	96:07	1	37:39	3
3	59:22	5	99:55	1	37:55	1 +
1	61:51	1	3300:73	1	37:90	3
2	61:80	1	01:22	1	38:13	2
1 +	62:93	3	02:06	2	39:26	1

3339.75	1 +	3376.25	2	3413.50	1	3450.61	1
40.16	3	77.15	2	13.83	1	51.10	1
40.37	1	78.60	1 +	13.90	1	51.34	1
40.64	2	78.88	1	16.25	2	52.44	1
41.73	2	79.16	2	16.61	2 d	53.18	3 + d
41.98	3	81.24	2	17.42	2	53.81	3
42.28	2	81.50	3	17.75	3	54.28	1 +
43.02	2	81.95	1	18.88	1	54.45	1
43.23	1	82.21	2	20.11	1	55.44	1
43.57	1	83.05	1	20.34	2	56.14	6
43.80	2	83.35	1	21.12	1	56.66	1
44.31	1	84.22	1	21.20	1	57.24	1
44.50	2	84.41	1	22.55	1	57.39	1
44.86	1	85.23	10	22.76	1	59.00	1 + d
45.57	1	87.85	1	23.01	1	59.50	1
46.12	4	89.73	2	25.22	5 r	61.13	1
46.48	2	89.88	3	25.76	2	61.54	2
46.80	1 +	91.15	1	28.19	1 +	62.38	4 Tm?
47.05	1 +	91.90	1	28.54	3 r	62.73	1
47.74	1	92.13	4	29.35	1 +	64.64	4
47.84	2	93.15	1	30.07	3	65.27	1
48.00	2	93.35	1	31.23	1	69.90	3
48.26	3	93.70	2	31.33	1	71.06	1
48.87	2	94.24	2	32.45	1	71.87	4
50.21	3	94.54	2	33.27	3	72.97	1
50.42	3	95.00	2	34.21	1	74.42	2 + d, Nh?
51.46	2	95.43	1	34.52	1	74.86	1
54.73	1 +	95.94	1	34.76	2	76.45	1
55.00	1	96.22	3	34.90	1	77.20	1
56.35	2	97.50	3	36.45	1	78.06	2
58.29	2	97.65	2 Tm?	37.10	1	79.57	3 r
60.62	1 +	97.97	1	37.57	1 +	80.60	3
61.17	2	98.16	1	37.77	2	80.85	1 +
61.81	2	98.41	2	38.45	2	81.90	1
62.78	4 Tm	99.08	3 + r, d	38.60	1	82.75	1
64.22	4	99.75	1	41.25	3	84.71	2
64.56	1	3400.10	1	41.65	3 r	84.99	2 d, Nh?
65.68	1	01.36	2	42.26	1	85.31	2
66.40	1	02.00	3	42.50	1	86.02	4 r
66.85	2	03.00	1 d	42.79	3	86.96	3 r
68.21	8	03.85	1	43.87	2	87.52	1
69.12	1	04.27	1	44.43	1	88.66	1
69.77	1	07.12	2	45.60	1	89.50	2
70.72	3	07.95	2	45.70	1	90.21	2
72.92	20	08.56	1	46.52	1	90.39	2
73.79	1	08.83	2	47.00	2	92.65	2
74.32	5	09.36	1	47.66	2	93.30	1
74.66	1	10.01	2	48.18	2	93.84	1
74.80	1	12.02	1	48.69	1	94.27	1

3494·64	1	3536·15	2	3588·89	2	3629·54	2
94·93	1 d, Nh?	36·33	1 T _m	89·09	2	30·01	1
96·99	3	36·90	1 +	90·91	3	30·23	2
99·28	15	37·40	1	91·30	1	30·46	2
3500·10	1	38·65	2	91·55	1	31·94	1
01·30	1	39·42	2	92·18	2	32·22	5
02·95	3	39·69	3 d	93·30	2	32·65	1
03·54	1	43·15	3	94·28	1	32·93	2
04·22	1	45·30	1	95·20	1	33·40	1
04·64	1	45·97	2 +	95·65	1	33·70	6
05·22	3	47·67	3	95·97	2	34·81	2
05·85	2	48·36	3	96·40	1	35·47	1
06·96	1	49·66	2	97·94	1 +	36·50	1 + d
07·35	1	50·00	4	99·02	1	37·30	3
07·63	1	50·36	1	99·62	4	38·82	4
07·80	2	51·95	2	99·99	6	39·13	1
08·53	4	52·46	1	3600·54	1	40·35	1
08·97	1	53·36	3	00·93	2 r	41·41	3
09·05	1	54·47	2	01·70	1	42·05	2
11·85	1 +	56·54	1	04·86	2	43·77	2
12·05	1 +	57·00	2 +	05·05	3	45·55	3
12·85	1	57·24	1 +	05·85	1	46·09	5
12·93	1	57·99	1 +	06·20	2	46·93	2 +
13·20	1	58·17	2	07·56	2	47·36	1
15·06	3	58·86	2	08·33	2	49·12	1 +
15·72	1 d, Nh	60·05	4 r	09·53	1	49·32	1 +
16·15	1	63·34	1	12·57	1	50·53	5
16·61	1	63·57	1	12·73	1	52·71	3
16·83	1	63·70	1	13·03	1	53·02	4
17·06	1	65·33	2	13·27	1	53·76	1 T _m
18·02	1	66·06	1	14·80	2	54·50	1
18·31	3	66·28	1	16·21	2	56·51	1
19·25	1	66·62	2	16·75	10	58·60	1
20·20	3	67·50	1 T _m	17·29	1	58·96	1
22·66	1	69·40	1	17·98	5	59·27	1
24·15	2	70·91	2	19·08	5	59·71	2
25·08	3 r	71·87	2	19·56	1	60·68	1
26·53	2	73·25	2	20·35	2	60·92	2
26·92	2	74·01	2	21·12	2	61·85	1
27·26	1	76·42	1	22·32	1	62·17	2
29·49	1	76·51	1	24·45	1	62·43	1
30·50	1	78·43	2 +	24·75	2	63·01	2
31·43	2	79·56	2	25·45	2	64·00	1
31·86	4	80·65	5 r	26·56	1 +	64·58	3
34·47	1 +	82·00	1	27·02	1 +	65·35	1
34·67	1 +	86·80	2 +	28·00	1 +	65·95	1
35·00	1	87·40	1	28·21	3	66·29	1 +
35·09	1	87·92	3	28·79	1	67·78	1 +
35·65	3	88·49	2	29·08	1	68·22	2

3668·66	1	3712·52	4	3757·00	1	3864·93	2
69·18	3	16·10	2	57·15	1	65·25	1
72·45	1 +	17·37	2	57·50	2	80·80	3
73·28	1	18·05	4 Tm?	59·25	1 +	83·04	2
74·23	1	18·75	1	59·66	1	84·26	1
75·32	2	19·46	4	60·10	1 +	85·52	1
76·65	3	21·65	2	60·48	1	87·50	3
77·37	1	23·78	2	61·50	8	88·21	4
78·15	1 +	24·18	1	62·09	6	89·11	1 -
78·71	1 +	24·55	3	65·18	1	89·92	3
79·03	2	25·06	3	66·31	3	90·77	4
80·21	1	25·20	3	67·91	2 +	91·05	1 -
82·84	4	26·90	1 +	68·91	2	91·20	3 -
83·61	1	27·05	1 +	70·38	1	92·45	1
84·16	3	27·39	1 +	71·26	3	92·87	5
84·44	4	28·12	1	72·60	2	94·62	1
85·02	1	28·95	1	75·01	1	94·76	1
87·23	1	29·69	10	75·80	3	94·97	1
89·25	3	30·20	1	77·24	1	95·46	1
89·77	1	31·41	5	77·76	2	95·94	2
90·45	1	31·91	2	78·44	2	96·40	15
90·82	1	32·33	1	78·80	2	97·35	1 -
91·25	1	32·65	1	79·09	1	98·66	2
92·85	20	32·89	1	81·19	4	99·16	2
94·40	4 Ad	33·69	1	86·31	1	3900·95	2
94·96	2	33·91	1	86·99	5	01·82	1
95·24	2	34·26	3 Tm?	88·04	6	02·95	10
96·40	4	34·65	5	92·00	4	04·01	1
97·07	3	35·83	1	92·98	2	04·15	2
97·39	1	38·34	8	93·10	2	04·70	3
97·82	3	40·41	3	94·53	2	05·24	1
98·33	1	41·23	4	94·96	1	05·59	3
99·07	1	42·00	1	95·18	1	06·47	20
3700·00	1	42·80	6	95·92	5	08·60	2
00·40	1 Tm?	44·21	3 Tm	97·25	5	09·72	1
00·89	4	45·11	2	98·36	1	09·98	1
01·52	3 Tm?	45·22	2	98·75	2 +	10·66	1
01·71	3	47·56	3	3803·25	2 +	11·70	2
01·99	1	48·78	1	10·50	4	12·06	2
02·65	1	49·15	1	10·89	5 +	12·57	2
03·41	1	50·30	1	20·57	4	15·00	1
05·01	1	50·71	3 +	28·20	2	15·84	2
05·79	1	51·95	1 Tm	30·69	10	16·13	1
06·67	2	52·12	1	33·19	2 +	16·60	2
07·78	4	52·34	1	35·78	1	18·18	2
10·40	1	54·42	1	44·40	2	18·48	2
10·92	1	55·06	1	48·17	3 Tm	18·67	2
11·95	2	56·19	3	56·51	1	19·76	1
12·17	1	56·51	2	60·10	2	22·05	4

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1	3983·30	2	4031·85	1 +	4098·28	5
1	83·81	1	32·00	1 +	4100·77	8
1	84·36	1	36·24	2	01·25	1
1	86·80	1	37·82	2	03·47	2
1	87·12	1	38·20	1 +	03·97	3
10	87·79	4	38·55	1 +	04·11	2 +
1	88·14	3 Ad	39·76	1	06·01	5
8	88·66	1 +	40·61	1	06·76	2
10	89·55	1	40·95	2	08·72	2
2	91·34	2	43·15	4	09·24	1
1	93·80	1 +	45·58	3 Nh?	09·51	1
1	95·02	2	46·04	2	09·61	1
1	95·44	2	47·09	4	11·52	1
1	95·75	1	48·48	4	12·80	3
2	95·90	1	49·61	3	16·52	3
3	96·67	2	50·70	1	18·70	3
3	96·82	1	54·05	3	20·36	1
3	98·18	1 +	55·19	1	20·97	1
1 Tm	98·33	1 +	55·62	8	23·23	2
1	99·32	3	56·00	1	23·39	2
2	4000·61	3	56·10	1 +	24·94	1
3	01·73	1	57·97	1	25·78	1
1	03·02	1	59·64	2	26·35	1 +
3 Tm	04·21	2	59·98	10	27·26	2 Nh?
2	04·73	1	61·24	1	29·60	1 +
2	07·23	1	62·14	1 +	31·69	4
3	08·12	10	63·10	2	38·48	2
3	08·31	8	65·20	1	40·35	1 +
1	08·88	1 +	65·46	1	43·11	10
3	09·34	5	68·45	1	51·29	15
1	09·92	2	69·36	1 +	58·58	1 +
4	10·70	1	69·73	1 +	60·45	1 +
1	11·26	1	72·55	1	63·18	3
10	12·41	1	73·29	1	64·96	2
10	12·76	8	74·16	2	78·75	1
15	13·15	1	76·15	2	81·05	3 +
1	15·77	6	78·10	8	85·62	1 +
2	16·52	1	81·43	8	86·92	3 +
3	17·48	1	83·20	1	87·73	5
1 +	17·79	1	86·84	1	90·14	5
1	18·62	1	87·80	10	90·86	5
2	20·69	10	90·27	1 +	94·99	3 +
2	21·70	3	90·95	1 +	4200·08	2 +
2	22·16	3	91·95	1	00·80	1 +
1	22·95	1	93·05	2	03·89	5
1	24·53	1	94·36	5	05·45	1 +
1	25·68	1	94·81	3	11·89	4
1	26·57	1	96·97	1	18·24	1
4 r	27·20	1	97·03	1	18·59	8

4221·17	3	4292·32	2 +	4347·76	2	4395·91
22·79	1	93·25	2 + br	48·49	3	96·60
23·88	3	95·20	2 + br	49·92	2	97·58
28·1	1 + br	96·30	1 +	50·90	2	98·17
28·80	1 +	96·88	1 +	51·36	1	98·95
29·35	1 +	97·50	1 +	51·84	3	4402·01
29·73	1 +	99·09	3	53·53	1 +	03·31
30·35	8	4300·63	1	53·90	1 +	04·04
32·20	1 +	01·39	1	54·61	1	07·30
32·60	1 +	01·78	8	55·55	1	09·50
33·30	1	03·36	1	56·86	2	11·50
34·20	1	03·96	5	57·57	2	11·95
34·56	1	05·30	1	58·35	1	12·90
34·92	3	05·62	1	58·61	1	13·90
35·35	2	06·04	1	59·22	2	14·50
37·20	2 +	06·51	2	59·40	1 +	16·59
38·56	1	08·80	2	60·09	3	17·02
40·10	2 +	10·62	2	60·54	2	18·87
42·32	8	11·95	1	61·82	2	19·78
43·95	1	13·54	1	62·40	2	20·73
44·75	1	13·84	1	62·90	1 +	21·89
46·57	1	15·92	3	63·81	1	22·67
49·69	1	16·55	2	64·44	1	24·70
52·11	6	17·86	2	64·80	1	25·98
53·70	2	20·12	5	66·84	1	26·93
54·48	2 +	21·55	1 +	67·91	2	28·55
55·20	1 +	22·77	2	68·50	1	28·86
55·60	1 +	23·20	1 +	69·54	3	30·02
56·43	1 +	24·32	1	71·40	1 +	31·55
59·52	1 +	27·45	1 +	71·65	1	32·39
63·80	2 +	28·99	2	72·02	1	32·80
65·00	3	29·98	1	72·99	1 +	34·76
69·70	1	30·43	3	73·50	2	36·49
70·10	2	31·50	2	74·05	1	37·50
72·15	2 +	32·17	1 +	74·42	1	37·82
72·65	2	33·17	1	77·40	1 +	38·90
75·31	2	33·90	2	77·98	1	39·15
76·61	4	34·60	1 +	78·50	3	39·80
76·83	2	35·16	2 +	80·85	1	40·68
78·03	1	39·13	3	81·28	1 +	41·38
79·16	1 +	39·50	1	82·33	3	42·99
79·67	1 +	39·79	1	84·86	8	44·35
81·00	3	41·09	3	85·51	1	44·79
81·52	2 +	41·60	1 +	86·59	5	45·55
84·68	1 +	44·30	1 +	88·52	4	45·91
85·8	2 + br	45·21	2	90·35	1	46·42
86·72	5	45·92	2	91·85	1	48·78
88·65	1	46·70	1 +	92·03	1	49·49
90·10	1	47·41	1	94·59	1	49·84

1	4507:60	1 +	4550:59	2	4584:50	1
1 +	08:21	1	51:02	1 +	87:08	2
2	08:48	1 +	51:48	1 +	88:32	1 +
2	09:36	1	52:30	5	89:12	1
3	09:63	1 +	53:28	2 +	89:50	3
1	10:2	1 + br	55:86	2	90:97	2 +
1	11:2	1 + br	57:10	2	93:10	2 +
1 +	11:95	1 +	57:51	1	94:18	2 +
3	12:33	2	58:53	1 +	94:82	1
1	12:70	1	59:23	1 +	96:90	2 +
1 +	13:30	2	60:50	1 +	98:28	2
1	14:90	2 +	61:32	2	98:83	1
1	16:69	2	62:01	1	99:21	1
1	17:05	1 +	63:45	10	4600:70	2
1	18:10	1 +	64:11	2	02:22	2
3 r	18:80	1 +	64:50	1	03:88	1
2	19:12	1 +	64:99	2	04:15	1
1	19:64	4	65:26	2	06:27	1
1	20:82	2	65:95	1 +	06:79	8
2 +	21:84	1	66:55	3	08:95	1 +
2 +	22:80	5 d?	67:10	1 +	11:43	5
3	24:20	1 +	67:30	1 +	14:66	1 +
1	24:35	1 +	68:06	1 +	16:10	4
3	24:90	1 +	69:00	3	18:50	1
2	25:85	1 +	69:47	1	20:6	1 + br
2	27:12	3	69:82	2	21:19	1 +
2	29:56	2	70:52	1 +	21:74	1 +
1 +	30:33	1 +	70:80	1 +	22:20	1 +
1 +	30:51	1 +	71:35	1 +	22:70	1 +
1	31:28	3	72:08	1 +	23:20	1 +
3 r	32:00	1 +	72:70	1 +	23:86	1 +
2	32:45	1 +	73:17	2	24:55	1 +
1	33:85	1	73:57	1 +	24:96	2
1	34:15	1 +	74:02	1 +	25:74	2
1	36:10	1	74:96	1 +	26:45	2
1	36:70	1 +	75:13	1 +	26:78	2 +
1 +	37:25	1 +	75:64	1 +	27:45	1 +
2	38:35	1 +	76:08	1	29:30	1 +
3	39:5	1 + br	76:49	1	29:53	1 +
1 +	40:40	2	76:85	1	30:65	1
8	41:40	1	77:15	1	31:10	10
1	41:81	1	77:46	1	31:78	1
1	42:36	1	78:00	2	32:55	1
4	43:20	1 +	78:15	2 +	34:47	2
2	44:15	1 +	80:24	1 +	35:04	1 +
1 +	45:00	2 +	80:77	1 +	36:96	1 +
1 +	46:45	1 +	81:24	1 +	37:56	1 +
1 +	47:85	1 +	81:89	2	38:02	1
1 + br	49:10	1	83:73	1	40:78	5

4642:36	1 +	4698:40	1 +	4758:22	1 +	4845:80
43:40	1	98:83	1 +	58:80	1 +	47:8
44:61	1 +	99:86	1 +	59:83	10	48:60
45:50	1 +	4700:94	1 +	61:19	2	49:01
49:25	1	02:34	3	62:80	5	51:80
50:10	2	03:17	1 +	64:83	1 +	53:29
50:50	1	04:69	1	70:45	1 +	54:59
51:00	1 +	05:97	1	74:28	1 +	57:60
51:61	1 +	07:79	1 +	74:80	1 +	58:62
52:17	2	08:84	1	77:70	1 +	60:12
52:62	1 +	09:17	1	78:73	2	61:77
53:49	2	09:95	2	79:60	2	63:80
55:25	1 +	11:72	1 +	81:52	1 +	66:55
56:86	3	12:23	1 +	82:03	1 +	69:53
57:20	1	13:23	2 +	83:18	1 +	70:62
60:15	1 +	14:60	1 +	83:69	1 +	72:28
61:37	2 +	15:22	3	83:99	1 +	72:69
61:60	2 +	16:13	1 +	86:85	1 +	75:58
62:70	1 +	17:48	1 +	91:88	1 +	78:50
62:85	1 +	18:88	3	92:75	1 +	79:43
63:42	1 +	19:42	1 +	93:96	1	80:07
64:45	1 +	22:22	2 +	95:69	5	81:2
65:60	5	22:91	4	4800:18	1	86:49
67:78	2	23:43	2	01:56	1 +	89:01
70:30	1 +	24:71	5	02:58	1 +	89:47
71:28	1 +	26:30	2	06:17	1 +	90:30
71:77	2	26:50	1 +	08:91	1 +	96:55
73:32	3	29:21	4	10:75	1 +	97:13
74:38	1 +	30:99	1	11:60	1 +	98:32
74:80	1 +	31:80	8	14:26	1 +	4900:26
75:77	10	32:40	1 +	14:99	1 +	01:82
76:71	1 +	33:01	1 +	15:70	1 +	03:81
77:29	1	33:52	2	16:81	1	04:61
79:24	8	34:20	1 +	17:95	1	05:44
80:2	1 + br	35:58	1 +	20:52	8	06:10
81:68	1	37:16	5	20:92	2 +	07:25
82:13	1 +	39:20	1 +	23:73	1	09:46
84:79	3	40:48	1 +	24:75	2	12:28
85:90	1 +	42:18	2	25:36	2	17:00
86:60	1 +	44:30	1	26:27	1 +	17:25
87:20	1	45:43	2	28:24	2	22:35
88:77	3	47:29	2	28:85	2	22:80
90:65	1 +	50:07	1 +	29:71	2	25:25
94:25	1	50:92	1 +	31:34	5	25:60
94:75	1 +	51:25	1 +	34:94	3	27:16
95:22	1 +	51:71	8	36:40	1	27:52
96:50	1 +	54:79	3	40:60	1 +	29:05
96:78	1 +	55:45	1 +	42:21	2	31:97
97:33	8	57:30	1 +	43:13	1	32:30

Er

Bogen

0	2	5036:11	2	5226:27	1 +	5380:52	1 +
0	1 +	42:23	4	29:51	1	82:34	1 +
7	1 +	44:05	1	46:30	2	84:3	1 + br
5	1 +	45:05	2	47:15	1 +	85:10	1 +
5	1 +	45:49	1 +	47:95	1 +	85:80	1 +
0	1 +	46:17	2	48:90	1 +	86:40	1 +
2	3	52:87	1	56:11	5	88:90	1 +
0	1 +	56:34	1 +	57:20	2 +	96:05	2
7	1 +	58:90	1 +	64:93	2 + br	97:30	1 +
0	1 +	60:02	1 +	69:20	2	5403:90	1 +
5	1 +	60:60	1 +	73:07	2	04:30	1 +
9	1	61:13	1 +	76:15	1 +	05:95	1 +
8	1	61:80	1 +	77:82	1 +	14:85	4
0	4	63:42	1 +	79:05	1 +	18:25	1 +
5	2	63:55	1 +	79:45	2 +	20:05	2 +
1	2	66:08	1	82:80	1 +	22:99	2
5	1 +	66:93	1 +	86:15	1 +	27:73	1 +
5	1 +	70:22	1	87:60	1 +	29:85	2
0	1 +	70:53	2	89:90	1 +	32:65	1 +
5	1 +	72:65	1	98:8	1 + br	33:53	1 +
5	2	73:05	1	5302:50	2	34:00	1 +
3	2	77:80	3	04:70	1 +	34:35	1 +
3	1	82:01	1 +	06:02	1 +	34:74	1 +
3	1 +	92:40	2 +	07:30	3	35:6	1 + br
8	3	5103:50	1	15:40	1 +	37:07	1 +
0	1 +	13:31	2	16:7	1 + br	38:99	1 +
5	1 +	19:82	2	17:8	1 + br	40:00	1 +
5	1 +	24:75	1	19:10	2	45:85	1 +
9	1 +	27:60	3	23:17	1 +	47:10	1 +
0	1	31:72	2	24:33	1 +	48:42	1 +
5	1 +	33:20	2	25:15	1 +	54:45	3
5	2	33:99	3	28:24	2	56:78	5
7	1 +	34:38	1	29:25	1 +	58:59	2
5	2	43:79	2	30:87	1 +	62:65	3
0	1 +	44:29	2	33:27	2 +	64:45	1
0	1 +	60:56	2 +	33:50	1 +	68:54	4
1	3	64:00	2	34:40	2	69:84	2
4	3	65:01	3	37:33	1 +	75:40	2 +
4	1	79:68	1	39:50	1 +	77:68	2
5	1 +	81:16	1	44:10	2	86:16	3
3	1 + br	89:09	4	44:67	2	91:90	2
3	1 +	91:82	1 +	46:63	1	5503:98	2
3	2	5206:71	2	48:21	3	05:88	1 +
3	1 +	10:53	1 +	50:63	2	13:60	1 +
3	2	11:40	1	52:40	1 +	14:90	2 +
3	3	13:13	2	69:03	2 +	16:22	2 +
3	1 +	14:60	1 +	71:68	2 +	18:31	2 +
5	1 +	15:29	1 +	73:18	1 +	18:94	2 +
9	1	18:40	2	77:00	1	20:22	1 +

5529-95	1 +	5800-99	3	5990-14	1	6269-09	1
40-80	1 +	06-33	1	6007-04	2	71-85	1 +
53-30	2 +	06-70	1 +	08-13	1	75-19	2
56-75	2 +	12-30	1	08-98	1	81-62	1 +
63-30	2 +	13-15	1 +	15-06	2	87-11	2
93-61	3	14-48	1 +	15-99	2	88-84	1 +
5601-40	2 +	27-01	10	22-80	3	92-03	1 +
03-00	1 +	32-17	1 +	32-40	1	99-67	3
07-52	1 +	32-82	1 +	39-9	1 + br	6309-01	5
12-00	2	34-16	1	45-87	1	26-36	3
22-21	2 +	36-04	2	47-54	1 +	40-9	1 + br
26-75	3	38-98	1 +	47-85	1 +	47-43	2
31-61	3	40-14	1 +	48-42	1	51-80	1 +
32-75	1	41-39	1 +	53-05	1	62-00	1 +
36-40	1 +	42-89	1	55-08	2	66-79	1 +
40-52	3	44-30	1 +	55-49	1 +	80-93	1 +
58-72	2 +	50-29	3	61-51	1	84-25	1 +
65-18	2	55-53	3	67-74	1	88-39	3
65-67	2	57-16	1	76-69	3	98-32	1 +
76-02	3	57-70	1	79-92	1	6413-84	1
84-97	1 +	60-94	1 +	98-20	1	23-35	1 +
95-05	1 +	71-90	1	6105-42	2	32-73	1 +
95-75	1 +	72-62	3	08-60	1	39-29	1
99-20	1 +	73-77	1	15-63	1 +	41-56	2
5711-09	2	81-40	3	16-24	1	54-26	1 +
17-70	2	86-57	2	25-53	2	60-48	1
19-76	2	5902-32	2	27-10	1 +	82-00	1 +
27-19	2	06-30	2	49-54	1	92-58	3
33-65	1	09-46	2	70-29	2	6520-77	1
36-76	1 +	16-70	1	73-45	1 +	41-80	1 +
37-15	1 +	33-80	1	83-42	1 +	56-61	1 +
39-40	3	37-45	1	96-15	1 +	58-05	1 +
40-81	2	46-64	1	6204-77	1 +	83-72	3
48-88	2	47-95	1 +	09-44	1	93-8	1 + br
52-75	2	55-71	1	21-22	10	6601-36	3
57-85	3	56-33	1	22-09	1 +	05-20	1 +
63-03	5	57-54	1	31-10	2	16-99	1 +
64-04	1	59-19	1	44-9	1 + br	6722-14	1
70-15	3	68-95	2	49-15	1 +	23-00	1
83-06	3	71-16	1 +	55-3	1 + br	60-13	1
84-89	2	71-54	1 +	59-35	1	6848-40	1
88-89	1 +	75-74	1	62-79	3	65-4	1 +
91-40	1	83-20	1 +	68-17	1	6972-00	1

Kanten.

Kontinuierlicher Hintergrund von 5350 bis 5600 mit einem Maximum bei 5430.

XXIII. Eu. Europium.

Ältere Messungen: F. Exner und E. Haschek, Wiener Ber. CXI (1902).

Material: Europiumnitrat aus Oxid von E. Demarcay, auf Gaskohle.

Verunreinigungen: Ba, Ca, Sa.

Linienzahl: 857.

2373·00	1 +	2743·38	2	2947·44	2	3247·45	1 +
75·50	1	44·36	2	49·26	1	62·64	1
79·76	1	45·70	2	50·94	1	66·54	2
2421·64	1 +	47·38	1	52·79	3	72·91	2
52·20	1 Eu?	47·94	2	59·03	2	77·89	2
55·03	1	52·29	2	59·59	2	3302·10	2
60·55	1 +	73·01	1	60·34	3	04·35	1 +
61·84	1	76·65	1	91·46	3	04·65	1
71·23	1	80·64	1	95·33	1	08·15	2
90·77	1 Eu?	82·02	3	3001·48	1	13·46	2
2559·30	1	2802·10	1 Eu?	06·39	2	20·03	1
64·27	1	10·81	1	22·27	1	22·01	2
68·26	1	11·86	3	40·89	1	22·42	3
77·25	2	13·18	2	55·07	4	34·48	6
77·69	1 +	14·08	5	59·12	2	38·84	1
2604·68	1	16·30	3	67·09	2	50·57	3
35·56	1	20·90	4	67·81	1	51·35	1 +
38·84	4	27·36	1	67·88	1	51·70	1
41·37	3	28·81	4	69·23	1	53·85	2
53·69	1	29·40	2	76·20	1	54·54	1
58·51	1 +	33·20	1 Pb?	77·50	3	69·22	3
59·50	1	33·36	2	85·83	1	80·40	1
68·40	4	44·05	1	89·44	2	90·94	1
70·93	1 +	59·79	3	97·60	3	92·14	2
73·54	2	62·69	3	98·30	1	94·23	1
78·36	3	64·52	1	3106·31	3	96·73	4
82·72	1	71·69	1	11·55	6	3419·96	1
85·74	3	76·16	1	17·72	1	21·82	1
92·10	3	77·88	1	25·23	1	23·22	1
2701·21	3	78·97	2	30·83	2	25·19	3
01·99	4	87·01	1	32·27	2	26·60	1
05·36	2	87·97	1	37·06	1 +	32·69	2
10·09	2 +	92·65	3	50·00	2	35·34	2
17·06	3	93·16	3	68·40	2	35·85	1
24·04	2	93·95	3	73·75	2	41·15	3
27·87	4	2904·31	1	85·69	1	45·32	1
29·46	5	06·82	5	3210·65	4	53·62	1
31·45	1	09·10	3	12·89	5	54·00	1
32·68	1	12·43	1	13·84	3	54·25	1
35·33	1	17·54	1	35·26	2	57·17	3
38·66	1	25·19	4	41·55	3	57·70	1
40·71	2	32·65	1 + br	46·14	2	61·52	3

3468.02	4 Eu?	3683.63	1 Pb?	3901.07	1	3988.36	1
76.77	1	84.86	1 +	03.39	3	92.50	1
77.17	2 +	86.20	1 +	07.28	30	94.05	1
81.77	1 +	87.90	1	10.03	1	96.11	1
85.56	1	88.57	20	10.26	1 +	4000.87	1
88.45	1	89.12	1	11.16	1 +	00.95	1
3502.96	1 +	92.25	1 +	14.30	1	03.10	1
03.42	1 +	3708.6	1 +	15.35	1	03.88	1
05.45	1	11.02	2	15.75	2	10.57	2
08.99	1	13.58	2	16.11	3	11.85	3
11.20	3	15.05	2	16.93	2	12.95	1
21.26	4	17.03	2	17.43	4	14.52	2
22.52	1	19.30	3	17.81	1	14.78	1
23.63	1	21.4	1 +	18.61	2	16.82	3
31.25	2	22.77	2	19.19	1	17.75	4
32.36	1	25.10	30	27.60	1	25.60	1
38.26	1	25.93	1	29.02	2	26.10	2
40.0	1 + br	28.34	2	30.00	2	26.77	2
42.31	3	29.85	2	30.66	50	28.76	2
44.03	1	31.33	1	36.12	1	30.17	4
44.30	1	32.34	3	36.79	1	30.84	1
52.65	3	35.8	1 +	40.55	1	33.85	1
62.33	1	38.23	1	41.72	1	36.25	2 +
72.75	2	41.46	4	42.34	1	36.69	1 +
89.39	3	43.71	2	42.47	1	37.84	1 +
91.47	2	44.35	2	43.21	2	38.53	1 +
3603.40	3	60.95	1 + d	45.82	1	39.36	5
05.77	1 +	61.30	3	49.72	3	40.65	2 +
06.86	2	62.50	1 +	54.40	1 +	42.18	1
08.88	1	64.50	1	55.86	4	47.87	1 +
11.52	1	66.06	2	58.04	1	53.27	1
11.75	2	68.35	1	61.27	1 +	58.00	1 Pb?
16.30	1	70.40	1	63.75	1 +	58.64	1
18.34	2	72.30	1	64.61	2 +	59.19	1
19.97	1 +	74.26	4	65.06	4	59.55	1
22.70	1 +	99.16	3	67.27	2 +	60.20	1 +
29.94	1	3811.47	4	69.36	2	60.45	1 +
32.32	2	19.80	50 u	72.16	50	61.73	1 +
46.85	1 +	65.69	4	74.03	1	62.33	1
56.40	2	84.91	5	77.01	2	65.57	2
60.78	1	91.66	1 +	78.60	4	69.12	2
62.6	1 +	94.86	1	79.15	1 +	71.40	3
63.10	1	96.96	1 +	79.78	1	78.39	3
63.62	1	97.85	2	83.20	1 +	80.63	1
74.87	1	98.35	1	85.39	1	85.52	3
78.41	1	98.65	1	86.27	1	88.00	1 +
79.63	1	98.90	2	86.79	3	96.96	2
82.58	2	3900.36	1	87.25	1 +	4102.86	2
83.41	1	00.66	3	88.00	2 +	04.04	2

1	4	4270·67	1	4357·92	1	4485·32	3
2	1 +	76·05	1	61·73	1	88·46	2
3	3	76·35	2	68·59	1	95·20	1 +
4	1	79·40	1 +	69·67	2	4502·30	1 +
9	1	79·80	1 +	70·60	2 +	04·67	1
9	1	82·09	1	72·38	2	08·86	1
5	4	84·83	1	75·29	1 +	11·73	1 +
0	1	85·86	1	76·59	1 +	12·33	1 +
0	100	87·60	1	78·42	1 +	12·80	1 +
4	1 +	93·15	1 + br	80·00	1 +	13·40	1 +
1	1	94·04	1	81·17	1 +	14·90	1 +
4	3	96·93	1	82·24	1 +	16·71	1 +
0	1 +	97·60	1 +	83·31	3	17·52	1
4	1 +	98·88	5	88·09	3	21·13	1 +
0	1	4301·00	1	89·30	1 +	21·89	1 +
9	2	04·55	1 +	90·58	1	22·76	30
5	1 +	04·70	1 +	91·55	1	26·84	1
3	2	05·60	1 +	97·89	1	34·92	1 +
5	2	06·07	1 +	99·51	1	35·73	2
0	1	06·57	1 +	4403·34	1	36·25	1 +
8	2	07·00	1 +	05·44	2	38·26	1 +
6	1	10·75	1 +	07·25	1	39·48	2
5	2 +	11·20	1 +	09·30	1 +	49·68	1
6	2	11·45	1 +	12·20	1 +	52·40	1 +
2	4	13·62	1	13·72	1 +	53·30	1 +
	2 + br	14·00	1	14·80	1	55·78	1 +
0	1	17·84	1	17·42	2	65·10	1 +
0	3 +	20·30	1 +	19·83	1	67·90	1 +
0	100	22·74	2	26·60	1 +	76·50	1
4	1	29·56	3	29·93	1	77·12	1 +
5	1	30·17	3	33·41	1 +	78·73	1 +
3	1	30·79	3	35·01	4	81·55	1 +
6	1	31·36	2	35·75	50	85·90	1 +
1	1	32·60	1 +	36·40	2 +	86·05	1 +
1	1	34·91	1	38·12	1	86·52	1 +
6	1	35·62	1	41·65	1	91·25	1 +
3	1	37·83	3	45·33	1 +	94·27	50
0	2	40·08	1 +	49·03	1 +	97·51	1
0	1 +	40·67	1 +	51·77	1	4611·68	1 +
6	1 + br	40·85	1 +	56·06	2	14·79	1
7	1	43·45	1	64·00	1	16·68	1 +
0	1	46·07	2	64·75	1	25·50	2
0	1	49·90	1 +	65·13	3	27·47	50
8	2 +	50·20	1 +	66·18	1	30·02	1 +
5	1	51·45	1	71·81	1	41·60	1
3	1 +	52·41	1	72·15	1	44·44	1
0	1 +	53·64	1	77·33	1	50·68	1
3	1	54·95	2	80·27	1 +	51·74	1
	1	55·26	5	84·85	1 +	56·90	2

4658·80	1	4823·70	1	5077·54	1	5304·05	2
60·55	2	24·44	1 +	78·20	1 +	22·99	2
62·10	50	25·80	2 + d	85·80	1	50·60	1 +
65·24	1	29·48	2	89·25	2	51·87	2
69·53	1	30·03	1 +	92·86	2	53·04	1
69·81	1	30·50	3	96·60	2	55·27	2
71·33	1	39·10	1 +	98·89	2	57·79	8
75·62	1	40·61	2	5114·50	3	61·02	2
81·25	1 +	41·74	1	24·92	2	61·80	3
81·70	1	43·50	1	29·23	3	77·13	3
85·42	2	44·45	1	30·25	1	81·46	1
88·41	3	49·85	3	33·68	4	93·14	2
88·69	1 +	51·40	1 +	41·20	1 + br	5402·99	10
92·80	1	61·05	1 +	47·98	1 +	05·54	1
95·52	1	63·23	1 +	51·00	1 +	12·05	2
98·31	3	66·58	1 +	55·60	1 +	21·25	2
4704·62	1 +	67·79	4	60·23	4	27·14	3
09·95	1 +	79·35	1 +	66·89	3	43·78	2
12·29	1 +	79·65	1 +	78·17	1 +	51·74	10
13·77	3	84·23	3	78·85	1 +	53·17	10
17·40	2	94·85	3	93·89	1	72·50	4
18·79	2	4901·02	5	5200·00	3	88·86	5
24·15	1 + d	07·38	8	01·10	2	95·40	3
25·87	1	11·61	8	06·60	1	5501·10	1 +
28·35	1	17·69	1	08·03	1 +	10·73	5
36·82	1 +	22·42	1	13·51	2	26·83	2
39·36	1	24·89	2	15·25	4	33·45	1
40·70	2	28·19	2	17·16	1	42·77	2
56·14	2	33·01	2	23·64	3	47·66	10
58·90	1 +	38·47	2	34·10	1	70·52	10
63·10	1	47·52	2	36·28	1	77·33	10
64·15	2	50·30	1	39·41	1	79·82	3
70·98	3	53·68	3	42·86	1 +	80·26	4
77·87	2	60·37	3	48·85	1 +	86·46	3
78·84	2	62·71	3	49·34	1 +	88·98	10 (Ca)
81·49	2	68·89	2	56·28	1 +	92·48	1
84·20	2	75·90	2	59·93	1	5600·01	1
92·75	3	76·59	1	66·57	3	06·09	1
98·26	2 +	84·10	1 +	72·13	4	19·01	2
99·10	1	86·90	1	72·63	1 +	22·66	3
99·59	1	95·74	1	83·00	3	32·77	3
4801·00	1 + br	5013·32	5	85·85	1 +	45·98	5
04·26	3	23·09	5	87·45	1 +	74·06	2
09·47	3	29·72	4	89·45	1	81·33	1
13·72	1 +	33·71	3 +	91·48	1	84·48	1
14·70	1 +	56·17	1 +	92·85	1	88·6	1 + br
15·98	1 +	57·66	1 +	93·88	1 +	5731·06	2
20·05	1 +	63·90	1	94·83	2 +	39·19	2
20·63	2 +	68·10	2	98·30	1	65·40	5

3·91	3	5964·00	2	6108·37	2	6382·95	3
2·97	1 +	66·30	5	18·98	3	84·09	4
0·48	3	67·30	8	24·85	2	6401·15	5
5·90	1 +	68·7	1 + br	73·23	10	06·35	2
8·94	4	71·94	1	78·93	3	10·27	8
0·2	1 + br	73·00	4	88·32	10	11·54	4
1·15	1 +	80·75	1 +	95·25	4	28·52	2
1·21	10	83·43	1 +	6207·80	1 +	37·83	10
5·99	1 +	84·10	1 +	09·55	1 +	38·14	2 +
7·20	1	93·09	4	30·75	1 +	40·18	1 +
1·20	1	6003·3	1 + br	33·94	2	58·17	4
5·03	1 +	04·60	2	50·71	2 +	70·97	1
3·97	1 +	05·9	1 + br	62·47	10	83·29	1
3·23	3	12·43	2 +	67·18	2	6501·79	2
5·1	1 + br	12·80	3	86·19	1 +	19·81	3
1·5	1 + br	15·81	2	89·18	1 +	22·96	1 +
5·55	1 +	18·39	8	91·55	3	49·3	1 + br
2·98	1	23·36	2	6300·00	5	68·16	2
0·20	1 +	29·20	3	03·64	8	94·09	2
0·02	3	44·87	2	14·03	1 +	6603·85	1 + br
5·52	1 +	49·77	8	18·83	1 +	45·44	20
3·79	1	57·55	3	24·70	1 +	94·19	2
2·96	1	75·80	2	36·01	4	6745·18	1 +
5·74	1	77·63	1 +	50·22	5	6802·98	2
1·10	1	84·09	5	56·03	3	64·81	3
1·54	1	99·59	5	69·49	3	7077·40	1

XXIV. Fe. Eisen.

e Messungen: H. Kayser und C. Runge, Berl. Akad. (1888).
 . N. Lockyer, Phil. Trans. 185 (1894). E. A. Kochen, Ztsch. für
 wiss. Phot. 5 (1907) (Rot).

Material: Metall von Prof. H. Weidel.

Unreinigungen: Cu, Mn.

Anzahl: 2392.

Alle mit R bezeichneten Zahlen sind von Rowland übernommen und
 als Standards benutzt. Ausser diesen wurden auch eigene Standards
 det.

7·84	1	2265·17	1	2272·95	1	2287·32	1
0·17	1	67·01	1	74·22	1	87·70	1
3·23	1	67·20	1	76·14	1	89·10	1
5·99	1	67·56	1	77·20	1	90·63	1
9·61	1	67·65	1	80·03	1	91·21	1
0·20	1	71·92	1	80·31	1	92·64	1
1·52	1	72·20	1	84·17	1	93·97	1

2294-54	1	2385-07	1	2463-40	1	2502-59	1
97-00	1	88-71	2 R.	63-82	1	03-60	1
97-85	1	90-05	1	65-25	2	05-10	1
98-25	1 R	91-57	1	66-81	2 u	05-56	1
99-33	1	95-50	1	67-80	1	05-74	1
2300-26	1	95-72	3 R	68-97	2	06-66	1
01-76	1	99-33	2 R	71-06	1	07-49	1
03-55	1	2402-67	1	72-45	1	07-98	1
03-65	1	04-50	1	72-97	1 R	10-92	3 +
09-10	1	04-97	2 R	73-15	3 u	11-45	1
13-20	1	06-74	2 R	74-90	2	11-85	1
20-47	1	07-69	1	76-10	1 +	12-42	2
27-47	2	08-10	1	76-53	1	13-5	1 + br
31-40	2	10-60	2 R	76-75	1	13-95	1
32-89	2	11-15	2	79-58	1	14-79	1
38-08	2	13-41	1	79-87	3 u	15-96	1
39-7	1 + br	24-24	1	80-27	1	16-63	1
40-35	1 + br	29-57	1	82-22	1	17-20	1
43-57	2 R.	31-12	1	83-36	8 u, R.	17-75	1
44-15	1	35-96	1 +	83-61	2 +	18-20	3 +
44-36	2	36-43	1	84-29	3 +	18-91	1
45-15	1 +	38-26	1	86-06	1	19-70	1
45-45	1 +	39-36	1	86-45	1	21-10	1 +
48-20	2	39-82	2	86-77	1	22-01	1
48-38	2	40-21	1	87-15	1	22-60	1
51-28	1	41-74	1	87-46	1	22-94	10 u
54-96	1	42-67	2	88-24	10 u	23-20	1
59-18	2	43-96	1	89-05	2	23-74	2
60-08	2	44-60	1	89-89	3 +	24-40	2 +
60-38	2	45-29	1	90-72	5 u	25-13	1
62-10	1	45-62	1	91-24	3 u	25-49	1
64-90	2 R	47-80	1	91-51	2 +	26-35	1
66-66	1	50-55	1	92-08	1	27-58	5 u
68-66	1	51-50	1	92-26	1	28-97	1
69-52	1	51-83	1	92-45	1 +	29-20	1
70-57	1	52-26	1	92-73	1	29-36	1
71-49	1	52-68	1	93-34	2	29-63	1
73-81	2	53-57	1	94-09	1	29-93	1
74-61	1	55-65	1 +	94-34	1	30-79	1
75-26	1	56-2	1 + br	95-97	1	32-42	1 +
77-31	1	57-68	2 R	96-14	1 +	32-96	1
78-00	1 +	58-65	1	96-63	1	33-24	1
79-34	1	58-86	1	97-09	1	33-74	1
80-85	1	60-40	1	97-85	1 +	33-90	2
81-97	1 +	61-21	1	98-34	1 +	34-51	1
82-12	3 R	61-39	1 +	98-99	1	35-23	1
83-15	1	61-99	1	2501-23	3 u	35-69	3 +
83-34	1	62-30	1	01-57	1	36-85	2
84-47	1	62-75	3	01-80	1	37-26	3

2538·91	1	2585·97	3	2645·53	1	2711·75	3
39·05	1	88·10	2	47·66	1	14·14	1
39·42	1	91·35	1	51·81	1	14·49	3
40·75	1 +	91·64	2	56·24	1	14·95	1
41·07	2 +	92·37	1	56·87	1	15·40	1
41·91	1	93·61	1	61·4	1 + br	16·30	1
42·20	2	94·14	1	62·15	1	16·47	1
43·46	1	94·21	1	62·41	1	17·44	1
44·01	2	98·46	3	64·2	1 + br	17·85	1
44·81	2	98·94	1 +	64·77	1	18·51	2
46·1	2 +	99·49	3 R	66·51	1	19·11	8 u
46·98	2	99·62	2	66·91	2	19·48	1
48·15	1 +	2600·27	1 +	67·04	2	20·28	1
49·70	3 +	03·69	1 +	68·01	1	20·65	1
51·20	2	04·86	1	69·58	1	20·99	6 R
52·69	1	04·94	1	73·33	1	22·13	1
52·92	1	06·40	1	75·40	1	23·67	5 R
53·27	1	06·92	2	79·15	3 R	24·88	1
55·31	1 +	07·17	3	80·26	1	25·03	3
56·36	1	08·65	1 +	80·56	1	25·38	1
56·96	1	09·27	1	81·70	1	25·67	1
58·60	1	10·83	1	82·31	1	26·14	2
60·66	1	11·14	1	84·12	2 +	26·30	2
61·35	1	11·98	4	84·92	1 +	27·64	3
61·79	1	12·85	1	87·90	1 +	28·10	2
61·95	1	13·31	1	89·30	2	28·90	1
62·32	1	13·91	3	89·55	1	29·00	1 +
62·64	3	14·57	1	89·93	1	30·84	1
63·56	3	15·50	1	90·17	1	31·06	1
64·65	1	17·21	1	92·35	1	33·67	4 R
67·01	1	17·71	3	92·76	1	34·09	1
67·96	1 +	18·11	1	92·92	1	34·34	1
68·95	1	18·79	1	94·65	2	34·67	1
69·70	1	18·87	1	95·15	1	35·59	5
69·82	1	20·50	1	95·70	2 + d	37·04	2
70·64	1	21·77	3	96·08	2	37·40	2
72·84	1	23·45	1	96·40	2	37·89	1
74·46	1	23·63	2	97·11	1	38·27	1
75·85	2	25·76	3	98·25	1	38·50	1
76·77	2	28·39	3	99·19	2	39·62	5
78·02	2	29·66	1	2702·00	1	41·19	1
79·37	1	31·12	3	02·55	1 +	41·68	1
79·95	1	31·42	3	04·06	1	42·10	1
80·17	1	32·34	1	06·13	3	42·49	10 R
80·58	1 +	32·67	1	06·66	3	43·26	2
81·56	1	35·89	2	07·54	1	43·63	2
82·41	2	36·55	1	08·65	2	44·17	2
82·70	2	41·75	1	10·09	1	44·62	2
84·63	2	44·10	2	10·62	2	45·14	1

2746.58	3	2778.94	1	2832.55	3 R	2880.87	1
47.09	3	79.40	1	33.16	1	83.85	1
47.64	1	80.83	1	33.50	1	86.45	1
49.28	1	81.95	2	33.93	1	87.93	1
49.43	2	83.81	1	34.85	1	88.07	1
49.57	1	84.15	1	35.56	2	90.05	1
50.24	3 R	84.47	1	36.05	1	90.13	1
50.80	1	86.91	1	38.23	3	91.01	1
51.01	1	88.06	2	38.54	1	91.82	1
51.45	1	88.20	4 R	40.09	1	92.04	1
51.93	1	89.56	1	40.55	2	92.64	1
53.21	1	89.92	1	41.04	1	93.90	1
53.40	1	91.56	1	43.02	1	94.00	1
53.80	2	91.90	1	43.33	1	94.63	3
54.15	2	92.51	1	43.74	3	95.15	3
54.52	2	94.82	1	44.09	4	98.46	1
55.04	1	95.11	1	45.68	3	99.54	3
55.28	1	95.64	2Mg?	46.92	1	2901.51	2
55.85	4	96.98	1	48.80	2	02.05	2
56.40	4	97.88	3	51.64	1	04.26	1
57.42	3	99.24	1	51.90	3	06.54	1
57.96	1	2803.25	1	53.81	1 d	07.64	2
59.91	2	03.71	1	57.90	1 +	08.98	1
61.00	1	04.64	3	58.11	1 +	09.62	1
61.89	3	04.95	1	59.00	2	11.06	1
62.16	3	06.18	1	62.61	1	12.30	4
62.89	1	07.10	3	63.45	1	14.40	1
63.24	2	07.32	1 +	63.54	2	18.13	3
64.46	2	08.43	1	63.97	2	18.45	1
66.79	1	10.4	1 +	66.74	2	19.95	1
67.04	2	12.17	1	67.39	1	20.80	2
67.64	3	13.42	4	67.65	1	22.50	1
68.23	1	15.15	1	67.96	1	22.75	1
68.55	1	15.62	1	68.30	1	23.41	2
69.06	1	17.60	1	68.54	1	23.55	2 +
69.44	2	19.40	1	69.01	1	23.96	2
69.78	1	20.91	1	69.40	3	24.05	1 +
70.82	1	23.40	4	69.94	1	25.47	1
72.21	3	24.46	1	72.45	3	26.00	1
72.44	1	24.78	1	73.65	1 +	26.69	2
72.65	1	25.66	2	73.72	1 +	27.65	1
72.97	1	25.77	2	74.27	3	28.22	1
73.36	1	26.09	1	74.98	1	28.85	1
74.84	2	26.58	1	75.40	2	29.19	10
75.06	1 +	27.80	1	76.80	1	29.70	1
75.94	1 +	27.98	1	77.40	3	31.52	1
76.55	1 +	28.90	2	78.83	1 d	36.68	1 +
78.20	1	31.05	1	79.00	1	36.53	1 +
78.34	2	31.67	2	80.69	1	37.02	10

2937·91	4	2976·65	1	3025·96	5 R	3080·22	1
39·15	1	77·00	1	26·59	4	83·86	6
40·70	1 +	79·46	1	29·33	1	90·34	1
41·46	4	80·65	2	30·28	4	91·23	1
43·72	1 +	81·59	3	31·31	4	91·70	5
44·50	1	82·00	2	31·77	4	93·45	1 R
45·16	1	83·70	15 u	33·22	1	93·94	2 d
47·46	1	84·93	2	34·22	2	94·99	1
47·76	1	85·65	1	34·62	1 +	95·36	1
47·99	10	86·55	1	35·83	1 +	97·00	1
48·55	2	86·74	1 +	37·51	8 R	98·30	2 R
48·80	1	87·40	3	37·86	1	3100·07	5
49·02	1	87·69	1	39·40	1	00·44	3
49·30	1	88·55	1	40·55	3	00·80	3
50·37	5	90·50	2	41·77	1	01·13	1
51·46	1	91·76	2	41·86	2	01·69	1 Ni?
51·66	1	94·54	15 u	42·15	2	02·85	1
53·60	2	96·50	2	42·77	4 R	03·00	1
53·91	1	99·34	1	45·18	2 R	03·94	1 +
54·05	5	99·63	5	45·68	1	08·10	1 +
54·75	2	3000·55	3	47·05	1 +	10·40	1
56·80	1	00·97	2	47·15	1 +	10·99	1
56·97	1	01·08	4	47·72	20 u, R	11·86	1 +
57·50	5	02·75	1	48·55	1 +	11·95	1 +
59·46	1	93·14	3	49·45	1 +	12·20	1
59·80	1	04·22	1	53·17	2 R	13·71	1
60·13	2	04·74	1	53·56	1 +	16·35	1
60·42	1	05·42	1	55·37	3 R	16·71	4
60·68	1	07·25	3	55·83	1 +	17·74	1
60·77	1	07·39	3	56·35	1 +	19·59	2
61·31	1	08·24	5	57·56	15	20·54	2 R
62·24	1	09·20	2	58·59	1	20·99	1
64·33	1 +	09·70	5	59·20	15	21·90	1
64·75	1	11·61	2	60·68	1	22·42	1
65·16	1 +	12·01	1	61·10	1	23·45	1
65·40	4	12·57	1	64·07	1	24·99	1
65·95	1	14·27	1	66·61	1 R	25·79	5
66·36	1	16·04	1	67·34	15	26·26	2 Cu?
67·02	15 u	16·30	4	68·08	1	26·85	1 +
68·59	1	17·73	3	68·29	2	28·96	1
69·49	2	18·22	1	69·57	1	29·19	1
69·62	3	19·10	3	74·12	1	29·43	2 R
70·24	5	19·40	1	74·30	1	32·64	1
70·65	1	20·55	1	74·59	1	34·21	3
72·40	1	20·75	20 u	75·88	8	35·55	1 +
73·25	3	21·19	20 u	77·27	1	35·70	1 +
73·35	10 u	24·15	4	78·14	1	35·95	1 +
74·92	1 +	25·39	1	78·55	1 R	36·59	1
76·24	2	25·72	3	80·13	1	38·60	1

3139·84	1	3188·93	3	3248·33	3	3324·67	1
40·02	1	91·77	4	49·31	1	25·59	1
40·50	2 R	92·91	3	50·77	1	28·97	2
42·59	2	93·37	5 d	51·38	2 R	31·74	1 R
43·01	2	94·53	1	52·58	1	31·89	1
43·35	1	96·22	1 R	53·06	1	34·33	1
44·10	3	97·06	5	53·74	1	35·87	1
44·62	2 R	99·63	4	54·50	2	36·36	1 +
45·18	1	3200·59	4	57·35	1	37·78	2
47·40	1	00·90	1	57·74	2	38·77	1 +
47·74	1	02·69	1	60·14	1	39·30	1
47·90	1	05·51	4 R	60·42	1	40·70	2
48·50	1	07·21	1	62·17	1	42·05	1
50·43	1	08·60	1	62·46	2	42·37	1
51·47	3 R	09·45	2	63·51	1	42·44	1
53·34	3	10·36	3	64·65	2	48·07	2 R
54·60	1	10·97	3	65·17	2	51·68	1
55·40	1	11·64	1	65·75	4	51·92	1
56·39	2	11·81	2	68·36	1	54·22	1
57·16	3	12·11	4	71·14	4	55·38	2
58·01	3	13·47	1	71·60	1	56·55	1 R
60·78	3	14·18	5	71·81	1	59·63	1
61·49	1	14·53	2	74·56	1	66·94	1
62·07	2 R	16·07	4	76·59	1	67·02	1
62·46	1	17·51	3 R	77·50	1	69·70	3
65·13	1	19·71	4	78·84	1	70·96	4
65·98	2	19·93	4	80·40	2	72·23	1
66·55	2	22·21	10	83·04	1	78·81	2
68·04	1	25·92	10	84·73	2	79·15	2
68·99	1	27·19	1	85·55	1	80·26	3 R
71·47	1 R	27·91	4	86·90	8	82·56	1
71·78	1	28·36	2	89·09	1	83·83	2
72·19	1	29·05	1	91·15	2	84·14	3
73·80	1 +	29·24	2	92·16	2	87·55	1
75·15	2	30·00	1	92·73	3 R	89·87	1
75·55	3	30·14	1	98·26	2	92·17	1
76·47	1	30·35	2	3302·51	1	92·45	3
78·11	3	31·10	3	03·14	1 +	92·81	5
79·06	1	33·17	2 R	03·70	1 +	94·74	2
79·62	1	34·11	4	06·12	8	97·12	2 R
80·35	5	34·74	3	06·50	8	97·76	1
80·86	2	36·35	3	07·35	1	99·49	5
81·65	1	39·56	5	10·48	1	3401·67	3
82·01	1	43·51	1	10·61	1	02·40	2
82·18	1	44·30	5	14·88	2 R	04·50	5
83·10	1	46·12	3	17·26	1	06·58	1
84·84	1	46·60	1	19·38	1	06·94	3
85·00	3	47·07	2	22·63	1	07·60	10
88·65	2	47·37	1	23·87	2	10·32	1

	3473.46	1	3532.75	1	3575.50	2
	73.65	1	33.15	3	76.13	2
	74.57	1	33.36	4	76.91	2
R	75.59	10	34.68	1 +	78.51	1
	75.76	3	35.05	1	81.38	50 u
	76.51	1	36.71	5	82.35	2 R
	76.85	10	37.64	1 R	83.50	2
	77.98	1	37.87	1	84.84	4
	78.75	1	39.05	2	85.15	2
	83.16	2	40.28	2	85.47	5
	85.15	1	40.85	2	85.88	5
	85.49	3	41.26	8	86.27	3
	89.81	1 R	42.24	8	86.93	1
	90.73	20	43.54	1	87.13	8
	93.46	1	43.81	1	87.56	1
	93.85	1	44.77	1	87.90	2
R	95.45	3	45.79	3	88.75	3
	96.05	1	45.9	1 +	89.10	1
	97.29	4	47.33	1	89.26	4
	98.00	15	50.01	1 R	89.59	2
	3500.72	1	52.25	1	91.55	1 +
	05.02	1	52.96	2	92.86	1 +
	05.22	1	53.87	3	93.50	1 +
	06.66	2	54.25	3	94.77	4
R	08.64	2	54.65	1	95.45	1
	10.01	1	55.04	8	96.35	1
	10.60	1 R	57.02	5	97.20	1
	13.20	1	58.67	10	98.88	1
	13.99	10	59.22	1	99.30	1
	14.78	1	59.65	1	99.77	1
	16.55	1	60.85	1	3602.25	1
R	16.69	1	64.26	1	02.66	3
	18.85	1 +	64.68	1	03.35	4
	19.00	1	65.54	20 u	03.95	1
	21.02	1	66.46	1	04.52	1 +
	21.43	10	66.75	1	05.35	1
	21.98	1 R	67.16	1	05.61	6
	22.44	1	67.50	1	06.84	8
	23.05	1	68.56	1	08.29	1
	23.46	1	70.00	1	09.01	20
	24.25	2	70.14	1	10.32	6
	24.40	2	70.29	50 u	10.84	1
	26.20	3	71.36	1	12.24	2 R
	26.32	4	72.15	3	13.10	1
	26.55	3	72.75	1	13.30	1
	26.81	3	73.55	1	13.62	1
R	27.95	3	74.02	3	14.26	1
	29.97	3	75.28	1 +	14.70	1
	30.54	2	75.40	1	14.89	1

3615·33	1 +	3651·61	5	3688·61	1	3737·30	30 u
15·81	1	53·90	1 R	89·60	3	38·45	2 R
16·72	1	54·15	1 +	90·62	1	39·24	1
17·46	1	54·80	1	90·88	2	39·70	2
17·93	4	55·18	1 +	91·48	1	40·39	2
18·52	3 +	55·60	2	92·80	1	42·34	1
18·91	20	56·39	2	93·18	1	42·74	2
20·65	1	57·27	2	94·15	4	43·52	15
21·61	4	57·61	1	95·20	3	44·25	2
21·88	1	58·08	1 +	95·73	1 +	45·70	20
22·18	4	59·67	3	97·57	2	46·06	10
23·35	3	60·50	1 +	98·76	2	46·63	1
23·58	1	61·52	1	99·28	1	47·08	2
23·93	1	63·01	2	3701·23	4	48·40	20
24·46	1	63·40	1	02·17	2 R	49·07	2
24·97	1	63·61	1	02·65	1	49·62	30 u
25·29	3	64·11	1	03·67	1	51·98	1
28·24	1	64·72	1	03·83	1	52·56	1 R
30·50	2 R	66·40	2	04·00	1	53·74	3
31·24	3	67·00	1 +	04·61	2	54·64	1 +
31·60	20	67·40	2	05·74	20	56·20	1 +
32·19	3	68·11	1	07·19	2	57·08	1 R
32·70	2	68·37	1 +	08·06	20	57·63	1
33·13	1	69·29	2	08·76	1	58·39	30
33·41	1	69·67	4	09·39	20	60·20	2
34·00	1 +	70·20	2	09·75	1 +	60·67	2
34·47	2 +	70·97	1	11·36	2	63·99	20
34·81	2 +	72·84	1	11·56	1	65·69	4
35·32	1	73·23	1	16·05	2	66·84	1
36·32	2	74·10	1 + br	16·60	3	67·35	15
36·81	1	74·56	1	18·55	2 R	68·17	1
37·14	1	74·91	2 R	20·09	50 u	70·15	1
37·40	1	76·45	3	21·45	1 +	70·46	1
37·99	2	77·03	1	21·74	1 +	73·91	1 +
38·44	4 R	77·45	2	22·10	1	74·97	1 R
40·55	5	77·80	5	22·73	20	76·60	1
43·29	1 +	79·00	2	24·54	3	77·57	1
43·82	2 + d	80·09	10	25·65	1	78·65	1
44·97	1	80·95	2 +	27·05	2	78·83	1
45·26	1	81·40	1	27·24	1 +	79·60	1
45·65	1	81·81	1	27·79	15	81·35	1
45·97	2	82·39	5	28·81	1	86·10	2
47·59	1	83·21	5	30·55	2	86·30	2
48·00	30	83·79	1	31·10	2	86·81	3
49·43	2	84·26	4	31·54	2	88·02	10
49·65	3	86·15	3	32·55	4	89·32	1
50·17	2	86·40	1	33·49	10	90·25	4
50·44	2	87·24	1	35·02	50 u	90·90	1
51·30	1	87·60	10	35·46	3	92·31	1

3793·64	1 +	3850·17	8	3918·55	1	3990·00	1 +
94·05	1	51·01	5	18·77	2	90·57	1
94·49	2 R	52·74	2	19·21	1 R	94·28	1
95·16	10	54·52	1 +	20·42	10	96·15	1
97·66	3	56·53	15	23·10	10	97·55	4
98·67	10	59·36	3	25·80	2	98·20	2
99·71	10	60·03	30 u	26·11	2	4000·62	1 +
3801·84	1	61·48	1	28·10	15	01·81	1 R
01·94	1	61·75	1 +	30·49	15	05·42	15
02·15	1	63·90	1	31·27	1 +	06·48	1
02·44	1	65·72	8	32·77	1	06·78	1
04·17	1	67·35	2	35·95	2	07·44	1
05·50	4	69·73	1	37·47	1	09·85	2
06·35	1	71·89	1	41·03	2 R	13·96	1
06·85	3	72·70	8	41·40	1 +	14·68	2
07·68	3	73·91	2	42·59	2	17·26	1
08·87	2 R	76·18	1	43·47	1 +	18·40	1 +
10·90	1	78·19	15	45·01	1	22·01	2
12·05	1	78·75	15	45·25	1	24·87	1
13·14	10	84·50	1	47·14	1	29·86	1 +
13·80	1	85·66	2 R	47·66	1	30·63	2
14·02	1	86·45	20	48·25	2	32·13	1
14·67	2	87·21	10	48·90	2	32·79	1
16·00	20	88·67	10	50·10	3 R	34·64	2 (Mn)
16·46	2	88·94	1	51·32	2	40·81	1
17·79	1	91·01	1	52·75	2	44·06	1 +
20·61	50	92·56	1	53·30	1	44·77	1 R
21·33	3	93·54	2	55·51	1	45·99	50
21·97	2	94·09	1	56·10	1	50·02	1 +
24·24	1	94·17	1	56·60	2	55·01	1
24·60	20	95·83	10	56·81	4	55·17	1
26·07	30	97·60	1	57·16	1	57·49	1 +
26·99	1	98·05	2	63·26	1	58·39	1
28·00	20	98·16	3	64·65	1	58·90	1 +
29·58	1	99·18	1	66·21	3	62·60	2 R
30·99	1 +	99·89	10	66·75	3	63·50	1 +
33·46	2 R	3900·66	1	67·56	2	63·77	30
34·40	20	03·13	10	68·12	1	66·75	1
36·46	2	04·05	1 R	69·41	15	67·15	2
37·27	1	05·69	1 Si?	70·55	1	67·43	2
38·45	1 Mg?	06·62	8	71·47	2	68·15	2
39·40	2	08·06	1	73·84	1	70·95	1
40·61	15	09·83	1	76·75	1	71·92	20
41·22	15	09·97	1	77·01	1	73·95	1
43·13	1 +	10·99	1	77·90	3	74·95	1
43·39	3	13·79	1	81·95	2	76·79	3
45·31	1	16·85	2	84·13	2	78·51	1
46·55	1	17·30	3	85·55	1	80·02	1
46·94	2 R	18·46	1	86·34	1	80·40	1 +

4084.65	2 R	4175.79	3	4247.57	3	4352.90	4
85.16	1	76.72	2	48.36	1	58.67	1
85.46	2	77.76	2	50.31	10	66.05	1
87.24	1	81.94	4	50.99	15	67.75	1
95.15	1	82.55	1 R	55.68	1 +	68.06	1
98.34	1	85.08	3	58.50	1	69.95	3
4100.90	1 R	87.22	8	58.80	1	73.75	1
04.28	1	87.99	10	59.15	1	76.11	5
07.65	3	91.62	5	60.3	1 + br	82.96	1
09.97	3	91.8	1 +	60.68	20	83.71	100
13.13	1 +	95.50	2	64.39	1	88.06	1
14.60	2	95.78	1	65.45	1 +	88.59	2
18.70	4	96.40	1	67.14	1	89.43	1
20.38	1	98.47	5	68.00	2	91.50	2
21.97	1	98.80	1 +	68.93	1	4401.50	3
22.68	1	99.25	6	71.36	15	04.95	50
23.90	1	4200.12	1	71.95	30	07.87	4 R
26.35	1	01.10	1	74.07	1	08.58	5
27.77	2 R	02.20	10	78.40	1 +	15.31	20
27.95	1 +	04.15	3	80.07	1	22.74	5
32.25	15	05.72	1	82.59	10	27.50	8
33.06	2	06.87	1	85.60	1	30.37	1
34.03	1 +	07.31	1	88.30	1	30.79	5
34.55	1 +	08.77	1	90.55	1	31.83	1 +
34.83	3	10.52	4	91.05	1	32.71	1 +
37.16	2	13.82	1	91.64	2	33.32	4 R
40.10	1 +	16.33	3	94.32	15	33.92	1
43.59	5	17.70	2	98.20	1 R	35.33	2
44.05	15	19.52	3	99.40	15	37.11	1 +
47.84	3	20.51	1 R	4302.34	1	38.53	1 +
49.53	1 R	22.40	4	04.71	1	40.07	1 +
50.45	1	24.34	3	05.63	1	42.52	8
53.34	1	24.68	1 +	08.09	30	43.00	1
54.09	4	25.62	3	09.20	1	43.36	5
54.67	4	26.12	1	09.54	2	47.01	1 +
54.98	3	26.59	1	15.29	6	47.30	1 +
56.96	4	27.60	6	21.98	1	47.89	8
57.95	3	29.64	1	25.97	30	50.52	1
58.96	2	29.90	1	26.92	1	54.55	4 R
65.60	1 +	33.79	6	27.27	1 R	55.20	1 + Mn?
68.10	1 +	36.11	10	28.09	1	56.50	1 +
69.10	1 +	37.30	1	37.24	6	58.29	2 +
71.09	2	38.19	1	38.45	1	59.31	10
71.90	1	38.98	3	43.45	1	61.33	1
72.29	2	39.96	2	43.86	1	61.83	10
72.90	2	40.52	1	46.73	1 R	66.74	10
73.50	1	42.90	1	48.00	1	69.56	6
74.10	1	45.43	2	49.10	1 +	72.88	1
75.08	3	46.22	1	51.70	1	76.22	10

4479.79	1	4600.04	1 +	4745.97	2	4934.20	1 +
80.30	1	02.19	2	57.78	1	38.35	1 +
81.80	1	03.14	5	68.59	2	39.00	3
82.39	10	07.84	2	71.91	1	39.42	1
83.00	1 +	11.48	4	73.01	2	39.87	2
84.40	4	13.40	2	79.64	1 +	46.57	2 R
85.83	2	18.95	1	87.00	3	50.31	1
88.30	1 +	19.48	3	88.95	2 R	57.49	5
89.13	1 +	25.23	3 R	89.85	3	57.80	10
89.91	3 R	30.31	2	98.46	1 +	66.27	2
90.25	1 Mn?	33.10	3	4800.82	1	68.11	1
90.92	1	36.03	1	03.07	1	70.11	1
94.76	10	37.69	3	07.90	1	73.31	1
4505.00	1	38.20	3	32.88	1 +	78.79	1
14.38	1	43.67	2	36.01	1	82.70	3
17.70	2	47.62	3 R	38.67	1	83.48	1
22.77	1 +	50.05	1	39.70	1	84.07	2
23.60	1 +	54.77	5	43.30	1	85.42	1
25.31	4 R	57.80	1	55.86	1 R	85.73	1
26.63	2 +	61.73	1	59.90	6	89.13	1
28.80	10	62.19	1	63.85	1	92.50	1
29.80	2 +	67.64	4	71.50	8	94.32	2 R
31.32	5	68.30	4	72.31	8	5002.03	4
39.98	1 +	69.35	2	76.07	1 +	05.89	2
42.60	1 +	73.37	2	78.39	6	06.31	5
47.19	1 R	79.02	4	81.90	1	07.47	1
48.02	3	80.50	1 +	82.33	1	12.23	5
49.66	1	82.27	1 +	85.62	1 R	15.13	2
51.02	1 +	83.74	1	86.52	1 +	18.60	1 +
52.76	1	87.56	1 +	87.40	1 +	22.41	1 R
56.31	4 R	88.38	1 +	88.81	1	27.30	1
60.22	1	90.30	1	89.20	1 + d	28.28	1 +
64.90	1 +	91.58	4 R	90.96	8	41.21	2 +
65.50	1 +	4700.35	1 +	91.70	10	41.90	3
65.83	1 +	01.22	1 +	93.03	1 +	50.00	4
66.65	1 +	05.11	1	4903.50	5	51.83	3 R
67.06	1 +	05.62	1 +	07.92	1 R	54.85	1 +
68.93	1	07.49	6	09.60	1	60.30	1 +
74.39	1	09.22	2	10.21	1	65.16	4
74.89	1	10.46	3	10.52	1 +	65.35	3
80.74	1 +	21.16	1	10.76	1 +	67.33	1 +
81.69	2	27.58	2 R	17.41	1 +	68.99	4
83.93	1	28.71	2	19.20	10	72.25	1 + br
84.91	1	31.65	1	20.70	15	72.98	1 + br
87.24	1	33.74	3	24.10	1	74.90	8
92.84	5 R	36.01	1	24.96	2 R	76.50	1 +
95.55	1	36.96	6	28.07	1 +	79.11	2
96.23	1	40.50	1 +	30.51	1 +	79.41	3
98.30	2	41.70	2	33.52	1 +	79.92	2

5083.54	3	5196.26	1 +	5298.99	1	5411.15	20
91.01	2 +	97.70	1	5302.50	8	15.40	50
97.20	2 +	98.87	3	07.54	2	17.27	1 +
98.88	4	5202.49	5	15.25	1 + br	22.20	1 +
99.20	1 +	04.76	2	16.83	1 +	24.30	100
5105.72	1 +	08.77	6	20.25	1 +	29.94	20
07.62	2	15.37	6	21.30	1 +	30.76	1
07.81	2	16.41	6	22.25	1	33.15	1 + br
09.80	1 + br	17.53	5	22.83	1	34.76	15
10.57	3 R	18.07	1	24.38	20	35.20	1
21.81	2 +	23.33	1	25.24	1	35.60	1
23.90	3	25.70	1 R	26.33	1	36.50	1 +
25.31	5 +	27.02	5	28.21	15	36.80	1 R
26.43	1 +	27.35	8	28.70	8	40.12	1
27.54	2	28.16	1	29.64	1 +	41.60	1 +
29.81	1	28.57	1	30.18	2 R	41.75	1 +
31.64	2	30.01	5	32.90	1 +	45.28	20
33.85	15	33.15	20	33.10	2	47.15	20
36.25	1	34.76	1	33.50	1	47.97	1
37.58	10	35.54	2	40.15	10	48.60	1
39.42	3	36.32	1	41.21	10	55.81	50
39.64	8	38.27	1	43.60	1 +	56.69	1
41.92	2	42.63	3	49.9	1 + br	61.25	1
42.70	2	43.94	1	53.57	3 R	61.75	1 +
43.11	2	47.18	1	61.8	1 + br	63.15	8
45.27	1	50.35	1	62.95	1	63.49	10
48.38	5 + d	50.82	3	65.00	20	64.49	1 R
51.02	2 R	52.15	1 R	65.60	3	66.62	4
52.11	2	53.62	2	67.61	20	67.20	1
59.23	1 +	55.10	1	70.13	20	70.36	1
62.52	8 r	55.50	1	71.70	15	72.93	1
64.70	1	63.50	5	72.55	1	74.12	5
65.60	3	64.05	1	73.90	2	76.48	3
66.47	2	66.75	15	77.02	1	76.79	8
67.67	20	69.70	20	79.78	2 R	78.65	1
68.50	1	70.53	15	83.58	50	81.06	2
69.14	5	71.40	1 +	86.60	1 +	81.46	2
70.91	1 +	72.00	1 +	87.75	1 +	81.65	2
71.79	10	73.39	3	89.70	8	83.30	2
72.81	1	73.54	2	91.75	6 d	87.35	1
76.87	1 +	75.2	1 + br	93.41	10	88.00	6 +
77.43	1 +	76.18	1 +	95.47	1 +	92.06	1
80.20	1	80.09	1	97.35	15	93.71	1 R
84.50	1 +	82.01	8	98.49	3 +	94.67	1
88.08	1 R	83.83	10	5400.72	10	97.71	8
91.62	10	84.69	1 +	02.70	1	5501.69	8
92.51	10	85.30	1 + Ni?	04.34	50 d?	03.30	1 +
95.09	5	88.71	1 R	06.02	15	06.99	8
95.65	4	94.16	1	09.34	1 + R	08.55	1 + br

5510.75	1 + br	5650.20	1 +	5816.53	5	6157.93	3
12.50	1 +	52.55	1 +	38.6	1 + br	63.75	1 +
19.72	1	54.2	1 + br	52.40	1 +	65.56	2
22.70	2	55.4	1 +	56.29	1	70.69	5
25.77	2 R	55.71	3	59.83	4	73.55	2
32.99	1	55.9	1 +	62.52	10	80.41	2
35.63	3	59.00	15	84.09	3	85.92	1 +
38.75	1 +	61.00	1	5905.90	3	88.23	2
39.50	1 +	61.59	1	10.20	1	91.80	10
43.39	3	62.73	10	14.35	10	6200.52	3
44.18	3	63.15	1 +	16.49	1	13.64	3
46.73	2 R	67.71	2	28.06	1	15.34	2
47.23	1 +	79.20	3	30.40	10	19.49	4
53.78	1 +	80.47	1 +	34.93	3	27.00	1
55.07	6	83.34	1 +	49.6	1 + br	29.46	1
58.12	2	86.69	5	53.00	2	30.93	10
60.45	2	91.76	2	56.92	1	32.88	4
62.90	2	93.88	2	75.58	2	40.90	1
63.80	3	96.3	1 + br	77.06	3	46.53	10
65.82	6	98.25	1	83.94	4	52.77	10
67.57	2	98.62	1	85.01	8	54.47	3
69.82	10	5700.50	1 +	87.26	4	56.57	2
73.09	20	01.79	4	98.04	1 +	65.36	3
76.30	10	05.0	1 + br	6003.24	4	70.44	1
84.96	1	05.73	2	08.20	2	71.55	1 +
86.98	30	06.21	4	08.82	4	80.85	1 +
87.78	1	07.29	1	20.38	10	91.20	1 +
94.82	3	08.30	1 +	24.30	15	98.03	2
98.49	5	09.63	10	27.26	3	6301.76	10
5600.47	1	12.13	1	42.30	3	02.76	3
03.18	10	12.40	2	56.20	5	11.75	1 +
07.85	1 +	14.39	1	65.72	10	15.55	1
15.89	50	15.33	2	78.69	5	16.03	1
16.77	1 +	18.07	3	79.25	1 +	18.25	4
17.42	1 +	31.99	3	82.97	1	22.94	2
18.84	2	42.09	1	85.49	1	31.0	1 + br
19.75	1 +	48.15	1 +	89.75	1	35.52	4
20.25	1 +	52.23	2 +	94.0	1 + br	37.02	5
20.71	1	53.37	5	96.94	1	39.1	1 + br
24.28	1 +	62.65	1	6102.39	5	44.35	1
24.80	10	63.25	10	03.41	3	55.25	1
34.20	3	75.31	2	16.43	1 +	58.90	1
36.05	1 +	80.9	1 + br	28.08	2	63.15	1
36.88	1	82.37	5	36.83	10	64.6	1 + br
37.50	2 + br, d	91.27	1	37.12	2	64.9	1 + br
38.47	3	94.17	1	37.92	10	80.98	1
41.68	2	98.43	1	41.99	3	93.83	15
44.2	1 + br	5806.93	2 +	48.04	1	6400.25	20
49.90	1 +	09.49	1	51.84	1	00.55	1 +

6408·24	3	6475·89	1 +	6594·14	2	6810·55	1 +
11·90	10	82·15	1 +	6609·36	1	28·87	1 +
20·21	3	95·25	20	27·80	1 +	41·60	1 +
21·60	5	96·70	1 +	34·00	1 +	43·95	1 +
31·09	5	6518·67	2	63·62	2	55·45	1 +
36·65	1 +	46·48	3	78·22	4	6945·48	1 +
56·63	1	69·45	2	6726·95	1 +	79·15	1 +
62·99	2	75·20	1	50·43	1	7187·70	1 +
69·48	1 +	93·17	3	52·98	1 +		

XXV. Fl. Fluor.

Ältere Messungen: Fehlen.

Material: Fluorammonium auf Gaskohle.

Linienzahl: 0.

XXVI. Ga. Gallium.

Ältere Messungen: W. N. Hartley und H. Ramage, Astroph. J. 9 (1899). J. M. Eder und E. Valenta, Wiener Akad. 119 II a. (1910) (Rot).

Material: Galliumnitrat aus Metall von Lecoq de Boisbaudran, auf Gaskohle.

Verunreinigungen: Al.

Linienzahl: 14.

2450·18	2 + u	2874·35	10 u	4033·18	30 u	5360·0	1 + br
2500·27	2 + u	2943·77	10 u	4172·22	30 u	6397·10	20 +, r
2659·94	2	44·29	5 u	5354·0	1 + br, r	6413·98	8 +, r
2719·76	3	3020·61	3				

XXVII. Gd. Gadolinium.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Ber. 119 II a. (1910) (Rot).

Material: Gadoliniumnitrat von L. Haitinger, auf Gaskohle.

Verunreinigungen: Ce, Sa, Y.

Linienzahl: 1687.

2468·32	1	2769·93	2	2794·83	1	2833·97	1
88·83	1	70·29	2	97·06	3	36·80	1
2720·59	1	79·21	1	2808·47	1	37·10	1
42·50	1	81·54	2	09·83	3	40·34	2
50·30	1	90·42	1	11·05	1	40·43	1
64·16	2	92·10	2	14·11	1	41·45	1
68·61	1	92·19	1	33·86	2	54·01	1

3034·20	8	3121·91	1	3215·41	2
40·45	1	23·85	1	23·90	3
43·13	1	24·16	3	24·40	1
46·59	1	24·40	2	25·57	2
52·63	1	25·04	1	26·44	2
53·70	3	27·37	1	32·85	1
57·52	1	27·84	1	33·03	1
58·06	1	28·70	2	33·23	1
58·20	1	29·83	1	36·26	1
60·01	1	30·11	2	37·36	1
67·73	1	30·53	1	37·74	1
68·80	4	30·95	2	38·84	1
69·34	1	32·54	1	38·98	1
69·55	1	33·25	2	41·25	1
72·74	3	34·00	3	42·43	1
77·08	3	35·20	3	42·95	1
77·21	3	37·05	1	48·16	1
81·10	1	37·45	1	50·32	1
82·15	10	38·06	1	55·96	1
83·48	1	38·21	1	56·53	1
84·15	1	38·81	1	57·05	1
85·17	1	39·28	1	57·16	1
85·74	1	40·94	1	59·39	1
86·34	1	43·03	2	60·07	1
87·13	1	43·29	3	63·50	1
89·31	1	45·15	6	64·29	1
90·10	3	45·62	4	66·86	2
90·50	1	46·99	3	67·77	2
90·69	1	56·61	4	68·45	2
91·98	1	58·75	1	70·65	1
92·15	2	60·83	2	71·87	2
96·31	1	61·49	4	74·30	1
96·92	1	65·11	1	77·64	1
98·75	4	67·30	1	79·63	1
99·01	3	68·23	1	80·05	1
3100·66	10	68·36	1	81·75	2
01·30	2	69·66	1	82·40	2
01·53	1	71·20	1	89·23	1
02·04	3	73·00	1	91·60	2
02·69	4	87·21	1	92·35	3
05·65	1	90·40	1	94·21	2
08·48	2	91·15	1	98·65	1
11·30	1	93·31	1	3308·66	1
13·30	2	96·64	1	09·71	1
18·07	1	99·40	1	13·50	1
18·72	2	99·67	1	13·89	2
19·16	2	3203·51	1	15·74	2
20·09	3	06·55	1	16·47	1
20·29	2	07·82	1	16·69	1

3317:39	1	3403:21	1	3468:22	2	3553:87	1
18:19	1	03:43	1	69:13	5	54:63	1
20:58	2	05:67	1	69:44	1	54:94	1
21:50	1	07:06	1	73:04	1	55:47	1
29:47	2	07:75	5	73:41	5	57:22	5
30:50	3	09:42	2	76:45	2	58:32	4
31:59	5	11:15	1	78:16	1	58:59	4
32:30	3	12:15	1	79:66	1	60:75	1
34:21	1	12:72	1	80:70	1	62:05	1
36:34	4	12:88	1	81:49	8	63:93	1
37:11	1	13:40	2	82:00	6	64:19	2
45:55	1	14:32	1	82:78	3	64:54	1
46:15	4	17:09	6	86:34	2	64:75	1
50:21	2	17:44	1	91:85	1	67:20	1
50:63	8	18:87	8	92:10	6	67:30	1
52:68	1	19:17	1	94:16	1	67:77	1
56:63	1	22:06	1	94:57	6	69:69	1
57:75	1	22:62	10	97:50	1	70:54	1
58:57	2	22:76	3	3501:74	1	72:07	4
58:77	8	24:07	5	03:35	1	74:83	3
60:86	3	24:73	5	05:05	1	76:50	1
61:86	1	25:77	1	05:68	5	76:86	2
62:40	8	26:08	3	10:26	1	78:48	3
63:08	1	26:46	2	10:71	1	78:71	2
64:36	2	27:45	1	12:38	4	79:68	2
65:72	2	28:57	2	12:66	4	80:76	2
67:22	1	30:40	1 + d	13:80	2	82:06	5
67:79	1	31:13	1	16:88	1	85:12	10
69:76	2	31:65	1	18:01	1	86:68	1
70:55	1	33:18	5	18:76	1	87:28	2
73:00	1	39:37	8	22:60	1	88:33	1 +
74:82	2	39:93	3	24:37	5	90:60	4
79:87	2	40:13	8	25:28	1	91:56	2
80:17	1	41:92	2	28:67	3	92:05	2
80:67	2	46:42	1	30:30	1	92:85	6
82:39	1	49:74	3	31:73	1	93:56	2
88:75	1	50:52	6	34:15	1	94:83	1
89:05	1	51:40	4	34:35	1	96:99	1
91:04	1	54:30	3	35:05	1 +	97:83	1
91:45	1	55:03	4	37:24	2	98:94	1
92:70	5	55:39	1	37:61	1	3601:11	3
93:76	2	57:17	2	42:48	1	02:15	1
95:27	3	62:08	2	42:90	4	05:00	4
97:35	1	63:14	3	45:10	2	05:35	3
97:42	1	64:10	3	45:94	10	05:76	3
99:53	2	64:24	3	48:43	1	07:21	2
3400:12	3	66:65	1	48:64	1	08:01	1
01:20	2	67:09	3	49:08	1	08:87	4
02:20	3	67:43	5	49:52	10	09:28	1

3610·89	4	3687·90	5	3767·21	5	3850·85	8
11·03	3	93·76	1	68·60	20	51·15	8
13·05	1	94·17	2	69·59	4	52·65	10
13·58	5	96·90	2	70·15	1 (Fe)	55·72	4
14·33	2	97·89	5	70·39	1	63·20	2
14·56	2	99·90	4	70·86	4	67·13	2
17·32	3	3709·30	1	71·37	1	75·47	2
18·22	1	12·88	8	74·46	2	84·82	1
20·61	3	13·71	3	74·70	1	87·28	1
22·96	2	15·36	1	76·15	1 +	87·87	1
25·02	2	16·52	5	76·99	1	89·10	1
25·37	2	17·60	4	77·25	1	90·30	1
26·50	2	19·63	10	78·92	1	90·59	1
27·02	1	22·24	3	82·51	4	91·02	1
29·28	1	23·84	1	83·22	4	94·88	8
29·66	2	25·63	3	87·70	4	95·39	2
30·39	1	31·01	5	90·77	1	95·93	4
31·02	1	32·61	2	91·31	4	96·58	1
34·91	3	32·81	1	91·86	1	98·55	1
36·96	1	33·22	3	92·52	2	3902·57	5
39·16	2	36·60	1	95·65	1	02·89	1
40·32	3	39·90	2	96·08	1	04·45	1
41·51	3	40·19	3	96·62	10	05·80	1
42·68	1	42·05	1	3801·50	4	07·26	1 +
45·75	4	43·68	10	03·25	2 +	10·36	1
46·36	15	44·25	1 +	04·90	2	12·88	1
48·60	2	44·98	2	05·26	2	13·92	1
49·11	1	46·57	1 +	05·69	3	16·70	10
49·34	1	49·01	1	08·30	1	18·21	1
49·56	2	50·35	1 +	10·43	1	18·40	1
51·09	2	51·27	1 +	10·75	1 +	23·43	4
51·33	2	52·42	1 +	11·51	2	26·83	1
52·69	3	54·46	1	12·20	2	33·15	1
54·78	8	55·38	1	14·18	10	34·95	6
56·31	8	55·69	1	14·94	2 +	35·53	1
58·35	1	56·23	1	16·78	3	38·26	1
59·25	1	56·45	1	18·87	2	39·12	1
61·82	1	57·87	2	21·66	1	41·94	1
62·41	4	58·11	3	25·17	1	42·78	2
64·78	8	58·46	5	26·19	2	43·35	1
68·46	1	59·18	4	27·46	2	43·75	1
71·39	10	60·86	3	29·52	2	45·66	3
72·15	1	61·10	3	33·15	2 +	49·38	1
74·22	3	62·38	3	35·13	2	51·14	3
74·60	1	63·15	2	36·66	3 (Cy)	53·51	2
79·35	1	63·48	2	37·05	3	57·83	6
82·90	1	64·36	3	39·76	3	58·85	1
84·29	3	64·75	2	42·32	3	59·65	6
86·49	3	66·50	1 + br	44·70	4	60·27	1

3962:25	1	4036:98	1	4098:80	10	4197:21	3
63:81	2	37:49	10	99:08	5	97:82	4
66:45	2	38:03	8	4100:42	3	4202:65	2
67:01	1	39:63	1 +	01:45	1 +	05:00	5
68:45	1	39:80	3	02:85	1 +	12:16	8
69:15	2	42:90	1	05:16	1 +	15:13	6
69:45	2	43:85	1	05:93	1 +	17:31	5
71:24	2	45:16	3	08:55	1	23:16	1
71:91	4	45:26	2	10:79	2	25:26	5
72:34	1	46:97	3	11:60	4	26:02	8
72:86	2	47:23	1	11:92	2	27:27	3
74:17	4	47:95	2	13:95	1	29:94	3
74:99	1	48:73	2	15:54	1	32:63	1
75:28	1	49:34	1	19:54	2	35:24	1
79:49	3	49:59	8	23:16	1 +	38:97	4
83:17	2	50:05	10	26:32	1 +	41:45	1
87:38	3	50:51	1	27:83	1 +	44:00	2
87:96	2	53:48	5	28:53	1 +	45:50	1
89:38	1	53:82	5	30:59	15	46:70	3
91:84	1	54:89	3	31:65	3	51:90	10
92:85	1	56:17	1	32:45	6	53:50	5
93:40	3	58:40	4	34:31	3	53:76	5
94:36	4	59:55	2	35:60	1 +	55:58	1
96:50	5	60:05	2	37:26	5	55:69	1
97:94	3	61:47	2	40:60	2	60:25	3
4001:40	3	62:78	4	41:18	1	62:24	10
02:09	1	63:62	20 d	49:00	2 +	66:75	3
03:99	1	65:78	1	50:81	1 + br	67:15	3
05:07	3	66:20	1	51:80	1 +	68:89	3
07:11	1	68:51	2	52:50	1 + br	70:47	1
08:46	1	68:93	1	53:69	2	74:32	2
09:06	3	70:51	10	55:03	2	78:35	1
09:35	2	73:40	4	60:00	1 +	80:69	8
13:59	1 +	73:99	10	62:88	4	82:95	1
13:95	2	75:63	1	63:22	3	85:96	2
14:07	1	78:60	6	65:55	1 +	86:26	2
15:35	1	78:87	6	67:35	2 +	90:03	1
15:73	1	80:70	1	70:27	2	96:22	5
17:37	1	83:87	2	71:86	2	96:46	3
17:84	1	84:10	1	73:73	2	97:31	3
19:86	1	84:86	1	75:73	5	98:60	1
22:48	3	85:73	10	81:05	2 +	99:45	2
23:28	3	87:85	3	84:48	10	4303:62	1
23:48	3	88:96	1	88:20	2	04:22	1
27:75	1	90:58	3	90:90	4	05:05	3
28:30	3	92:89	4	91:21	4	06:49	4
31:02	3	93:90	1	91:50	1	07:48	1
33:65	3	94:66	4	91:75	2	08:43	2
35:54	1	98:20	1 +	93:29	1	09:45	2

4310·10	1	4366·68	1	4416·16	1	4467·23	3
11·14	3	67·45	1 +	17·43	1	67·33	3
12·17	1 +	68·73	1	19·22	5	68·35	1
14·00	4	69·30	2	20·80	1	70·61	1
14·54	3 d	69·91	5	21·39	3	71·43	3
16·20	5	70·33	2	22·62	6	72·04	1
16·39	3	72·19	1 +	24·27	2	73·13	1
20·66	2	73·99	4	25·18	2	73·43	1
21·30	5 d	74·39	1	26·30	2	74·29	3
22·35	3	76·20	1	27·18	1	74·74	1
23·07	1 +	78·24	1 +	27·76	1	76·29	4
23·80	1	78·70	2	29·10	1	77·35	1 +
24·21	3	79·70	1	29·62	1 +	77·95	1 + d
24·71	2	80·82	3	30·82	5	78·95	4
25·83	10	81·30	1	31·90	2	81·23	4
26·47	2	82·25	3	33·82	2	83·49	4
27·29	10	83·30	3	36·38	4	84·68	1
29·08	1	86·36	1	37·60	1	84·88	2
29·72	2	86·87	1 +	38·04	1	85·63	1 + d
30·45	1	87·32	1	38·40	4	86·51	2
30·73	3	87·81	5	38·62	1	86·75	1
31·05	1	89·12	2	39·22	1 +	88·60	2
31·53	2	90·06	2	44·80	1	88·73	1
33·39	1	90·14	1	45·15	1	89·10	1
35·40	2	91·12	3	45·61	1 +	91·44	1
36·36	1	91·61	2	46·65	3	91·95	1 +
36·90	1 +	91·80	1	47·53	1	92·20	1
37·65	2	92·22	2	48·31	1	92·90	1 +
40·41	1	94·27	1 +	49·16	1	93·30	1 +
40·73	1	94·88	2	49·56	1	93·84	1 +
41·43	8	97·66	3	50·13	1	94·05	1 +
42·35	10	98·66	1	50·70	1 +	95·10	1
44·43	2	99·19	1	51·85	1 +	95·23	1
44·59	1	4400·35	2	52·50	1	96·78	1 +
46·60	5	00·93	2	52·86	2	97·31	3
46·78	4	02·02	5	54·08	2	97·50	2
47·42	3	03·30	3	54·88	2 +	97·72	1 +
51·05	1 +	06·82	5	56·80	1 +	98·44	3
52·81	1	07·38	1 +	58·50	1 +	4500·06	1
53·93	1	08·41	4	60·00	1 +	00·81	1
54·20	1	09·40	2	60·97	1	01·00	1
56·89	1	10·48	1 +	61·28	1	01·36	1
58·01	1	11·31	3	61·52	1	01·60	1
59·30	2	12·1	1 + br	62·98	2	01·98	1 +
59·77	2	12·9	1 + br	63·39	2	02·30	1 +
60·29	1	13·62	1	64·50	1 +	03·40	1
61·07	3	14·32	4	64·89	2	03·96	1
62·42	1	14·90	3	65·93	1	06·39	3
64·28	2	15·48	1	66·71	5	06·51	4

4507:10	2 +	4541:38	1	4581:25	2	4644:53	1 +
07:60	1	41:80	1	81:44	2	45:60	1 +
07:83	1	42:19	2	82:55	3	46:15	2
08:18	1	42:90	1	82:70	3	46:49	2
09:20	2	43:50	1	83:21	2	47:81	1
10:54	1	43:76	1	83:48	1	48:81	2 + d
11:30	1 + br	44:40	1	84:43	1	49:90	1 +
11:93	1 + br	46:42	1 +	86:24	1	50:15	1
12:63	1	46:80	1 +	87:14	2	51:55	1 +
12:78	1	47:20	1 +	88:93	1	52:10	1
13:41	1	48:17	2	89:70	1	52:49	1
13:71	1	50:20	1 +	90:16	1 +	53:70	2
13:98	1	50:60	1 +	90:95	1 +	53:90	1 +
14:18	1	51:10	2	94:17	1	55:16	2
14:70	3	51:64	1	94:44	1	58:00	1
14:90	1	52:20	1 +	97:14	4	58:77	1
16:00	1	52:49	1	98:07	4	59:58	1
16:62	1	53:25	2 + d	99:05	3	60:02	1 +
17:20	1 d	55:15	2	4601:20	5	61:35	1 +
18:59	1 +	55:67	1	03:08	2	64:40	2
18:95	1 +	58:26	3	05:70	1 +	65:80	1 +
19:80	4	59:20	1 +	06:22	2	66:61	2
20:24	3	59:80	1 +	06:78	1	71:02	2
21:44	2	60:63	1 +	08:16	2	73:85	1 +
22:10	3	61:22	2	08:73	1 +	74:24	1 +
22:60	1	61:68	1	11:13	1 +	74:55	1 +
22:98	3	61:92	1	14:66	3	74:70	1 +
24:29	1	62:85	1	19:33	1 +	75:35	1 +
24:55	1	63:17	1	19:80	1 +	75:90	1 +
24:88	1 d	63:56	1	20:60	1 +	77:15	1
25:59	1 +	63:88	1 +	22:75	1 +	77:80	1
25:72	1 +	64:77	1 +	24:55	2	78:40	1
26:23	1 +	67:01	1	25:86	1	79:35	1
30:80	1 + br	67:95	1	26:85	1 +	80:19	3
31:25	1 + br	68:20	1	27:40	1 +	82:04	1 +
32:00	2	68:82	1 +	27:81	2	83:25	1
32:44	1 +	69:70	1 +	28:25	1 +	83:50	3
32:80	1 +	70:21	1	28:56	1 +	86:56	2
33:68	1	70:50	1	28:93	1 +	88:29	2
34:70	1 +	70:76	1	30:66	1	88:55	1 +
34:90	1 +	71:11	2	32:10	1 +	89:15	1 +
36:07	1	71:70	1 +	32:60	1 +	91:33	1
36:53	1	72:36	1	36:80	3	93:00	1
36:71	1	72:60	1 +	37:44	1 +	94:48	3
37:12	2	72:72	1 +	38:77	1	95:27	1 +
37:96	4	73:38	1 +	39:15	3	95:65	2
39:36	1	73:95	2	40:20	2	95:92	1
40:18	3	76:03	3	40:70	1	96:16	1
40:40	1 +	79:73	3	41:46	1	96:91	1 +

59	3	4764:00	2	4848:25	2	4932:40	1
19	1	65:70	1	52:02	1	32:83	1 +
05	1 +	67:10	1	52:82	1	36:18	2
46	1	67:41	3	54:32	1	36:50	2
30	2	68:92	1	55:02	1	37:10	1
45	1	72:93	1	56:35	1	38:74	3
93	1	76:03	1	56:90	2	39:69	1
04	1	76:30	1	59:40	2	42:71	1
03	3	80:12	1 +	60:65	1 +	44:89	1
32	1 +	81:20	1 +	61:97	2	45:89	1
35	1	81:31	1 +	62:45	1 +	48:71	1
35	1	82:10	3	62:76	2	50:24	1
4	2	83:68	1 +	63:30	1	51:70	1
66	1	84:80	3	65:20	2	52:60	2
8	2	86:98	5 d	66:57	2	53:30	1
66	1	91:33	1	70:21	2	54:17	1
4	1	91:80	1	71:69	2	55:56	1
3	1	93:49	1 +	73:51	2	56:95	1 +
7	1 + d	93:61	1 +	76:61	1	58:91	2 +
0	1	97:17	1	77:76	1	61:60	1
8	1	97:68	1 +	78:26	1	65:20	1
0	2	99:84	1	78:68	1	67:63	1
0	1 +	4800:05	1	81:29	2	68:73	1
4	1	00:30	1	81:56	2	69:31	2
4	1	00:85	1	82:13	2	72:85	1
7	1	01:22	3	83:38	2	73:99	1 +
5	1	02:75	2	84:16	1	74:40	1 +
8	1	03:70	2	86:66	1	75:29	1
2	5	05:98	2	88:73	1	78:68	1
0	1	06:35	1	89:40	1	80:35	1
0	1 +	07:61	2	92:25	1 +	85:04	1
3	4	08:20	1	92:75	1 +	85:42	1
9	2	10:15	1	93:60	1 +	86:34	1 +
0	2	10:53	1	94:47	3	86:52	1 +
7	1	12:74	1	99:55	1 +	87:56	1
3	1 +	13:95	1 +	4902:57	1	92:38	1 +
0	3	14:61	1	03:00	1	95:48	1
7	2	15:21	1	06:57	1	96:03	1
9	1 +	17:00	2	10:29	2	98:54	2
8	1 +	19:98	1	11:00	1	99:22	2
3	1	21:86	3	14:65	1 +	5005:18	1 +
0	1	22:13	1	16:00	1	11:00	2
	1	30:11	1	16:75	1	11:93	1
	1	34:39	3	16:95	1 +	15:21	4
	1	35:41	2	20:49	1 +	17:40	1
	1	39:74	1	23:70	2	19:54	1
	1	43:99	1 +	25:89	1	20:55	1
	3	44:42	1 +	30:00	1	23:30	1
	2	46:66	1 +	30:86	1	31:46	2

5031:75	1	5176:46	3	5298:75	1	5370:10	3
39:81	1	78:30	1	5301:80	3	70:87	4
48:90	1	79:02	1	02:89	3	72:39	2
51:04	2	80:10	1	03:80	1	75:56	1
52:56	1	83:31	1	04:42	1	77:40	1 +
56:74	1	87:10	1	05:07	1	80:45	1
56:84	1	87:41	1	06:17	1	84:33	2
57:40	1	88:06	1	06:87	2	85:56	2
61:07	1 +	91:27	1	07:45	3	89:68	3
61:20	1 +	97:95	3	12:00	2	93:85	1
63:04	1	99:28	1 +	15:96	1 +	94:50	1
63:75	1	5200:72	1 +	16:95	1	99:74	1
66:29	1	10:66	1	18:45	1	5400:15	1 +
67:22	1	11:21	1	19:00	1 +	11:37	1
70:36	1	17:58	1	21:39	2	12:80	1
71:19	1	19:59	3	21:63	2	13:40	2
73:15	1	20:45	2	21:95	3	13:55	1
73:90	1	34:10	1	22:51	1	15:86	2
77:80	1	37:65	1 +	22:85	2	17:30	1 +
82:99	1	44:52	1 +	23:56	1 +	20:05	1
88:98	1	47:03	1	27:49	3	21:35	2
92:41	3	51:33	3	28:49	2	23:80	1 +
93:85	1	52:29	2	31:20	1	24:84	1
96:23	2	54:91	2	32:08	2	33:05	1 +
97:07	1 +	56:00	3	33:41	3	36:47	2
98:56	2	59:82	1	37:68	2	41:34	1 +
99:45	1 +	60:59	1	40:75	1 +	41:76	2
5101:10	1	61:00	1	41:31	1	47:90	1
02:95	1	63:99	1	41:95	1	52:85	1 +
03:63	4	67:50	1 +	43:17	3	53:20	1 +
09:09	3	67:97	1 +	45:26	2	53:63	2
12:10	1 +	68:20	1	45:80	2	55:48	2
23:80	1 +	68:97	2	48:80	3	59:75	1 +
25:70	2	71:15	1	49:81	1	60:80	1 +
30:42	2	71:60	1	50:51	5	63:45	1
32:40	1	71:95	1	53:38	4	69:22	1
35:75	1	72:55	1	54:56	1	69:90	2
36:20	1	73:10	2	55:01	1 +	70:70	1
41:00	2	74:93	1	56:20	1 +	75:88	1
41:65	1	75:84	1 +	57:95	1	80:42	1
42:82	1	76:71	1	59:32	2	82:20	1
50:00	1	80:81	1	61:82	2	91:62	1 +
56:00	3	82:66	2	62:35	1	91:85	1 +
56:94	1	83:23	3	62:76	1 +	93:60	1
58:67	1	84:04	1	65:54	2	93:90	1 +
61:08	1	84:60	1	66:54	1	98:95	1
63:88	1	86:00	1	67:86	1	5500:15	2
64:73	1	95:72	1 +	68:96	1	00:61	2
76:03	1 +	96:51	1	69:80	1	02:75	1 +

10	1 +	5630:35	1 +	5848:74	2	6001:20	1 +
40	1 +	32:20	1 +	49:03	1 +	02:10	1 +
29	1	32:47	3	51:84	5	04:81	3
85	1 +	33:70	2	55:43	2	08:97	2
00	1 +	43:44	4	56:42	5	11:37	1
73	1 +	43:90	1	57:21	1	21:37	2
78	1 +	45:04	1	60:98	3	44:32	1 +
33	1 +	53:53	1	69:18	1 +	45:30	1 +
40	1 +	57:55	1 +	70:44	1 +	49:77	1 +
91	2	61:63	1 +	70:83	2	60:20	1 +
77	1	72:33	1	72:90	1 +	64:58	2
70	2	77:68	1	77:00	1	80:91	3
02	1 +	86:87	1	77:50	3	82:63	2
56	1	92:34	2	80:19	1 +	6106:44	2
47	1	96:40	5	82:47	1 +	09:31	2
71	1	98:20	1	84:83	1 +	14:26	10
40	1	5701:59	3	86:71	2	32:6	2 + br
50	1	09:66	2	97:90	1	35:30	1 +
97	1	10:59	1	98:30	1	36:70	2 +
21	1	11:60	1 +	5901:91	1	38:60	3
41	1	22:22	1	04:30	3	51:40	2 +
40	1	24:97	2	04:81	3	53:22	1 +
93	1	28:55	1 +	08:67	1 +	54:30	1 +
90	2	32:39	1	11:70	1 +	64:71	2
85	1	34:10	3	13:80	3	68:40	1
45	1	36:20	2	17:01	2	68:69	1 +
84	1 +	44:83	2	21:60	1	69:20	1 +
30	1 +	46:51	3	22:30	1	72:20	1 +
81	1	49:59	2	30:59	3	76:50	1 +
10	1	52:05	2	37:10	3	76:88	1 +
86	3	54:40	3	37:96	2	80:63	3
36	1 +	59:40	1 +	42:47	1 +	87:25	1
50	1	69:99	2	44:23	1 +	6203:90	1
05	2	76:25	3	51:86	1 +	04:41	1
70	1	78:75	1 +	56:71	2	11:90	1 +
34	2	89:60	1 +	63:45	1	12:40	1 +
40	1	91:61	4	68:60	1	18:20	1 +
10	1 +	97:01	2	70:60	2	21:10	1 +
40	1 +	99:85	1 +	77:53	3	24:68	1
15	1 +	5801:53	1 +	77:95	1	34:52	1 +
47	1 +	03:14	3	82:70	1	36:52	1 +
16	1 +	07:27	2	83:67	1	38:73	1
67	1	07:95	2	84:80	1	41:40	1 +
40	1	09:49	3	87:39	2	49:32	1 +
11	3	16:10	3	88:29	2	55:95	1 +
71	1	21:20	3	91:10	1	59:35	1
64	1	23:17	2	92:13	1	60:07	1
13	1 +	40:70	2	96:97	1	60:60	1
76	3	45:96	1	99:35	3	61:39	1 +

6263·99	1	6331·61	2	6408·84	1	6565·09	2
67·4	1 + br	34·00	1	22·19	1	79·63	1
70·42	1 +	36·60	1	45·10	1	91·89	1
78·40	1	46·90	2	62·90	1	6634·59	2
89·99	3	48·15	1	70·55	1	40·30	1
93·12	2	51·50	1 +	80·36	1	44·20	1 +
99·33	1	60·83	1 +	84·25	1 +	81·50	1
6305·39	4	63·47	1 +	97·25	1 +	6731·04	1
09·35	1 +	69·06	1	6505·70	1	52·91	1
14·47	1 +	81·21	2	38·41	2	6828·55	1 +
17·43	1	83·46	1	49·53	1		

Kanten.

4578·13	K. V.
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Hintergrund mit Banden von 5800 bis 6300.

XXVIII. Ge. Germanium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall. Astroph. J. 1 (1895).

Material: Germaniumnitrat aus Metall von C. Winkler, auf Gaskohle.
Verunreinigungen: Ag, Ga.

Linienzahl: 27.

2314·30	1 +	2417·46	3	2644·30	2	2794·04	3
28·00	1 +	36·5	1 +	51·28	30	2829·11	3
38·74	1 +	98·08	3	51·69	20	3039·22	50
79·24	1	2533·34	3	91·45	20	3124·97	10
89·54	1	56·43	1	2709·70	30	3269·62	20
94·20	1 +	89·25	3	40·52	8	4686·08	5
98·01	1 +	92·64	20	54·69	30		

XXIX. H. Wasserstoff.

Ältere Messungen: Fehlen.

Material: Ammoniumfluorid auf Gaskohle.

Linienzahl: 0.

XXX. Hg. Quecksilber.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1891)
J. M. Eder und E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Metall mit Gegenelektrode aus Gaskohle.

Verunreinigungen: Pb.

Linienzahl: 78.

2374·8	1 + br	2753·03	20	3095·5	1 +	4078·02	10
78	2 + br	60·0	1 + br	3125·76	200 + u	4313	1 + br, v
2447·2	1 + br	74·7	1 + br	31·66	100 +	39·5	1 + br
64·4	2 + br	91·15	1 +	32·02	100 +	47·8	2 + br
78·6	2 + br	99·8	2 + br	36·4	2 + br	58·60	300
83	2 + br	2804	2 + br	44·6	2 + r	4916·7	50
2524	1 + br	05	2 + br	3305·3	1 +	60·3	30
34·90	10 +	20·2	3 +	41·80	50	5021·1	1 + br
36·72	30 u	47·86	2	51·7	2 +	46·3	1 + br
40·35	3 u	57·20	2 +	90·8	5 + br	5366·1	2 + br
76·6	3 + r	93·88	50	3543·6	3 + br	5405	1 + br
2642·5	2 + br	2925·80	20 r	61·35	3 + r	27	1 + br
48·2	1 + br	67·48	200 u	3650·32	100 + u	60·95	500 u
52·28	20 +	3007	2 + v	54·96	30	5769·6	300
53·90	8 + br	11·3	1 + br	63·22	50 u	90·3	300
55·30	4 +	21·7	200 + br	80·7	1 + br	5804·7	5 + br
58·3	1 + br	24·1	30 +	3751·9	1 + br	19	1 + br
60·3	1 + br	27·7	3 +	3984·12	5	90·3	1 + br
86·7	1 + br	38·68	2 +	4046·89	100	6123·6	1 + br
2700	1 + br	51	1 + br				

XXXI. J. Jod.

Ältere Messungen: Fehlen.

Material: Jod und Jodkalium auf Gaskohle.

Linienzahl: 0.

XXXII. In. Indium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1892).

Material: Indiumchlorid von E. Merck, auf Gaskohle.

Verunreinigungen: Ga.

Linienzahl: 28.

2306·17	2	2710·38	10 u	2932·75	10	3256·22	100 u
40·35	1 + br	14·01	3	57·14	2 u	58·68	20 u
2460·24	1	53·99	3 u ¹⁾	3039·46	30 u	61·20	2 Cd?
68·20	1 +	75·46	1	51·19	1	3610·65	1 Cd?
2521·41	5 + u ¹⁾	2837·01	3 u ¹⁾	51·31	1	4008·99	1 + u
60·24	10 u	58·19	1	66·42	1 u	4101·95	200 u
2601·90	3	58·30	1	3186·92	1 +	4511·55	300 u

¹⁾ Rote Komponente stärker.

XXXIII. Ir. Iridium.

Ältere Messungen: H. Kayser, Berl. Akad. (1897). J. M. Eder und
E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Metall von Heräus.

Verunreinigungen: Pd, Pt, Rh, Ru.

Linienzahl: 806.

Zwischen den Wellenlängen 3528 3589, 3707 3902 und 4050 4616
wurden die Aufnahmen auf Kupferelektroden gemacht, sonst auf Gaskohle.

2242·80	2	2409·46	1	2493·16	2	2572·47	1
53·60	1 +	10·26	1	96·36	1	72·79	2
55·22	1	10·82	1	2500·36	1	77·35	3
59·00	1	15·95	1	02·72	2	78·78	1
64·73	1	18·18	2	03·08	3	79·00	1
95·19	1	24·40	1	04·44	1	83·26	1
2300·11	1	24·74	1	05·82	1	86·14	1
04·30	2	25·01	1	06·70	1	92·15	3
05·54	1	25·07	1	07·70	1	95·93	1 +
09·00	1	25·75	1	08·42	1	99·15	3
15·46	1 +	26·61	1	09·80	1	2602·15	1
21·49	1	27·71	2	12·02	1	04·64	1
21·61	1	31·34	2	12·66	2	07·60	2
33·37	1	32·04	2	13·80	2	08·30	3
33·95	1	32·41	1	15·45	1	11·40	3
34·57	1	32·64	1	24·99	1	12·13	1
43·25	2	36·50	1 +	25·16	1	12·35	1
43·68	2	45·39	1	29·56	2	14·27	1
55·11	1	47·53	1	32·29	1 +	15·06	2
56·68	1	47·84	1	32·63	1	16·00	1
58·25	1	48·30	1	33·24	3	16·08	1
60·80	1	49·10	1 +	34·55	3 (Fe)	17·86	3
63·14	2	52·89	2	37·30	2	20·00	2
67·12	1 +	54·20	1	37·78	1	23·75	1 +
68·11	2	54·67	1 +	40·49	1	25·43	2
72·86	3	55·69	2	41·56	1	26·85	2
73·23	1 +	55·95	1	42·11	2	29·49	1
75·21	1	57·12	1	44·08	4	34·33	3
79·45	1	57·31	1	45·62	1	35·35	2
81·72	1	62·47	1	47·26	1	39·06	1
81·86	1	63·10	1	47·76	1	39·51	2
86·67	1	64·96	1	51·50	2	39·80	4
86·98	2	65·16	1	54·47	2	40·45	1
90·71	2	67·37	2	55·95	1	44·28	2
91·29	3	67·45	1 Pt?	63·36	1	46·35	1
94·41	1 +	75·19	3	64·27	2	52·60	1 +
2401·86	1	78·20	1	69·97	2	52·76	1
03·14	1 (Pt)	81·27	3	70·70	1	53·13	1
07·66	1	85·46	1	72·16	1	53·86	2

2	2740·08	1	2836·21	1	2930·30	1
2	40·16	1	36·51	4	30·75	2
1	40·22	1	37·42	3	33·25	1
5	44·09	3	39·32	6	34·76	8
3	47·62	1	40·35	4	35·30	1
2	56·20	1	41·80	1	36·20	1 +
5	58·33	2	42·40	2	36·85	8
1	59·11	1 +	49·86	8	38·60	3
1	59·42	2	51·56	1 +	38·87	1
2	60·00	2	51·65	1 +	39·40	3
1	67·47	1	53·43	1	40·66	3
4	67·76	1	55·96	1	41·20	2
4	71·76	3	56·03	1	43·30	10
3	72·58	3	57·05	1	47·10	3
2	74·05	1	60·77	2	47·48	1
2	74·73	1	62·49	1 +	49·89	3
1	75·09	1	62·60	1	50·61	1
1	75·65	3	63·95	3	50·89	2
1	77·55	2	66·76	2	51·35	8
2	80·55	1	68·70	1	61·03	1
1	81·07	1	69·80	2	61·59	1
3 v	81·42	4	73·46	2	63·11	2
1	85·33	3	75·10	1	65·34	2
1	94·20	1	75·72	4	66·24	1
5	96·55	2	76·10	4	68·32	1
1 +	97·45	4	77·79	4	68·60	1
1	97·82	5	79·51	3	69·07	1
1 +	98·29	4	80·29	1	71·20	1
2	99·84	1	81·30	2	74·24	2
1	2800·91	3	82·77	5	74·66	1
1 +	06·50	1	83·55	1	75·07	3
1	07·75	1	97·07	1	77·80	1
1	10·65	1	97·27	5	80·80	4
3	12·91	1	99·74	2	82·55	1
1	14·52	1	2900·50	1	85·94	3
2	15·00	1	02·09	3	90·77	3
2	17·04	1	04·93	4	96·20	4
2	23·34	4	05·75	2	97·31	2
1	24·59	6	07·36	3	97·54	3
1	27·27	1	09·66	2	3000·15	1
2	29·73	1	12·36	1 Pt?	03·78	4
2	30·57	2	16·49	4	05·33	2
5 ¹⁾	31·46	1	17·86	1	10·03	2
1 +	31·93	1	18·69	3	11·84	3
2 ²⁾	33·35	2	24·94	10	12·71	1
1	33·75	3	27·14	1	16·55	3

umt auch in Pt und Pd vor.

umt auch in Pt vor.

3017-43	4	3114-69	3	3217-70	1	3305-80	1
19-35	3	17-64	1	18-60	4	05-99	1
20-12	3	20-90	5	19-66	6	07-78	1
22-54	2	21-91	4	20-91	15	08-57	1
22-81	1	22-50	3	21-40	4	09-55	1
25-99	3 ¹⁾	22-82	1	23-65	1	10-69	5
29-50	5	24-20	1	24-06	1	11-16	1
32-55	2	28-51	3	26-83	2	12-31	4
33-75	2	33-23	3	29-40	5	16-80	2
34-66	1	33-45	8	30-90	4	17-45	1
37-86	3	33-89	1	32-14	3	18-60	1
39-38	5	36-56	1 +	40-35	3 ¹⁾	19-25	1
40-58	2	39-70	1	40-69	1	22-77	5
47-27	5	40-52	3	41-65	6	23-03	4
49-52	5	45-17	3	42-47	1	25-58	1
51-25	1	47-85	1	42-78	1	26-25	1
52-30	2	50-76	4	45-02	1	27-04	2
53-70	2	51-75	1 +	49-63	2	34-35	6
57-40	4	54-66	3	49-87	3	36-21	1
60-96	2	54-85	3	54-54	4	38-56	5
61-53	2	56-28	1	55-20	2	39-56	4
64-65	2	57-60	1	56-92	2	39-70	1
65-27	1	59-29	4	62-15	5	40-50	3
69-00	5	59-64	1	62-85	1	43-55	1
69-18	4	61-49	1	63-09	1	44-36	2
69-82	3	61-95	1	63-44	1	46-61	1
73-42	1	66-85	1	66-59	10	47-72	2
74-87	2	67-30	3	67-22	1	53-00	2
76-80	3	68-30	4	71-38	4	53-70	1
77-75	2	69-01	6	71-94	3	55-95	2
78-00	1	71-80	2	74-68	2	59-63	2
78-70	1	72-91	3	75-15	1	59-90	3
83-37	4	77-70	4	75-45	1	60-90	1
86-58	4	78-80	1	75-74	2	64-40	2
88-15	5	79-32	3	76-28	1	65-69	1
90-29	2	80-48	4	77-41	5	67-09	2
94-14	2	89-47	1	78-41	1	67-21	2
94-49	1	98-23	1	81-85	1	68-64	10
97-94	1	99-06	5	82-46	1	69-14	1
99-05	1 +	3200-16	1 +	84-69	2	70-78	3
3100-50	15	01-02	2	87-20	4	71-60	4
01-29	1	05-22	3	87-72	5	72-96	1
03-88	1	07-22	1	95-24	2	74-61	1
08-67	1	08-27	2	97-65	2	76-15	1
09-49	1	12-22	4	3303-24	1	80-01	1
12-48	1	12-37	4	03-78	2	81-18	3
14-16	3 Pd?	13-68	3	05-07	2	83-91	1

¹⁾ Kommt auch in Pt vor.

4570-20	3	4753-30	1 +	5047-05	1	54
71-15	1	57-30	1 +	50-75	1	
75-02	8	59-90	1 +	56-65	1	
80-22	3	67-07	3	63-10	1	
81-38	1	70-60	2	68-08	1	
96-37	1	75-32	1	80-40	1 +	
4602-21	1	80-10	1	5106-40	3	
04-44	1	91-59	1	14-70	4	
05-26	1	94-80	1	21-03	1 +	
05-95	3	96-89	2	23-12	4	
13-54	5	4800-20	1	45-59	3	
15-25	1	00-46	1	56-89	2	
20-03	4	04-22	4	57-58	2	550
36-60	1	09-19	4	58-83	2	
43-30	1	17-40	1 + d	63-77	2	
45-43	3	24-24	5	67-90	1	
46-51	1	27-06	1	74-01	1	
47-66	2	30-73	1	77-48	3	
48-82	2	39-71	2	83-60	8	
50-51	1	40-21	2	84-09	1	
52-30	2	43-5	1 + br	88-40	1	
55-66	5	50-81	2	5204-31	1	
60-85	1	51-02	2	12-01	3	
62-69	5	55-17	1	26-40	1	
63-92	4	61-09	5	34-46	3	
69-08	4	70-77	1	39-73	1	
71-98	3	79-05	1	41-00	1	
88-84	1	87-83	1	53-65	3	
91-34	3	4900-10	5	58-09	1	
92-67	4	02-06	1	59-57	3	
99-80	2	05-34	1	71-10	1	

5720·24	2	5892·92	1 +	6134·64	1 +	6390·70	10
27·53	1	95·05	2	43·25	1 +	94·46	15
35·20	2	5902·22	1	45·6	1 + br	99·24	3
40·90	4	04·59	1	46·77	1	6411·24	10
43·20	1 +	17·90	2	62·47	1 +	46·85	1
44·67	4	28·00	1	65·99	2	48·37	2
62·08	3	28·77	1	72·95	1	50·59	1
69·35	4	30·92	5	88·30	1	54·78	8
69·56	3	35·57	3	6203·75	1 +	56·24	8
70·21	3	36·50	3	18·40	1 +	68·7	1 + br
89·47	5	48·6	1 + br	33·75	1 +	85·80	1
91·58	8	60·88	1	35·10	1 +	98·43	2
97·81	4	62·90	1 +	36·48	1 +	6506·45	1 +
5805·99	4	71·35	1 + br	37·04	1 +	20·95	1 +
08·56	2	73·79	2	38·82	1 +	27·21	10
22·23	3	76·00	1 +	50·14	15	43·40	10
24·09	2	82·63	1	62·52	15 d	65·71	1
27·82	1 +	92·65	1 +	66·27	3	78·79	4
29·99	2	6007·62	2	88·0	1 + br	93·75	2
40·00	1 +	38·86	2	88·8	1 + br	6600·44	1
45·29	1	67·40	1 +	93·81	3	08·55	1
48·63	2	69·00	1	96·32	5	16·86	2
52·53	1	85·25	1 +	6305·71	1	44·7	1 + br
55·85	2	6100·64	2	10·39	1	51·12	1
63·95	3	07·53	1	11·15	1	61·64	1
73·26	1	04·75	2	18·48	1	71·7	1 + br
75·00	1	11·96	1	20·59	5	93·14	1
77·90	1	26·31	3	26·10	4	6709·75	2
78·28	1	27·30	1	58·33	1	53·33	1 +
80·90	3	29·79	3	60·42	1	74·52	1

2741·37	10 u ¹⁾	3986·2	1 + br	4602·20	100 + u	61
3232·83	50 u ¹⁾	4132·3	5 + br	03·17	100 + u ²⁾	62
3794	1 + br	4273·55	5 + br, r	4972·10	10 r	67
3915	2 + u, br					

XXXVII. Mg. Magnesium.

Ältere Messungen: H. Kayser und C. Runge, Berl.

J. M. Eder, Denkschr. d. Wiener Akad. 74 (1904).

Material: Metall auf Gaskohle.

Verunreinigungen: Al, Pb.

Linienzahl: 52.

2673	2 + br	2795·64	200 u	2936·70	3 +	3838·
98·5	1 + br	98·10	2	37·00	3 + r	4059·
2733·7	1 + br	2802·82	100 u	38·70	3 + r	4167·
36·8	1 + br	09·9	2 +	42·22	3 + r	4352·
65·5	1 + br	11·2	1 +	3074·20	2 +	80·
68·6	1 + br	12·0	1 +	91·20	15 u	4571·
76·82	20 u	15·8	1 + br	93·14	20 u	4703·
78·40	20 u	17·2	1 + br	97·08	30 u	30·
79·95	30 u	47·1	2 + br	3330·09	5	5167·
81·51	20 u	48·7	3 + br	32·31	8	72·
83·08	20 u	52·25	500 u	36·83	10	83·
90·97	5	2915·62	10	3829·51	30	5528·
95·01	2 u	28·9	2 +	32·49	50	5711·

XXXVIII. Mn. Mangan.

Ältere Messungen: B. Hasselberg, Stockholm Akad.

2584.41	2	2710.42	1	2806.92	1	2919.23	1
92.40	1	13.42	5 + -	08.12	2	20.60	1
93.04	2	26.22	5 + -	08.49	1	23.35	1 +
93.82	4 u	29.48	1	09.20	2	23.85	1 +
95.85	3 -	34.83	1	11.27	1 +	24.55	1
98.25	1	38.95	1	11.48	1 +	25.67	8 -
99.97	1	42.83	1	12.99	2	28.79	2
2600.33	1 +	43.50	1 +	13.60	2	30.35	2
02.23	1	44.39	1	14.09	2	33.19	3
05.78	4	45.64	1	15.13	1	34.13	2
10.26	1	47.86	1	15.71	1	35.75	1
12.94	1 -	52.40	1	17.26	1	36.25	1
13.65	1	54.00	1 + d	17.77	1	38.00	2 +
15.97	1	59.08	1	18.09	3	39.40	3
18.22	2	61.03	3	18.85	2	40.01	1
18.50	1	63.76	1	19.00	2	40.50	8 -
19.01	2	64.00	1	19.46	1	41.15	2
19.60	2	67.58	1	19.83	1	41.80	1
20.09	2	71.55	2	21.58	2	42.85	1
23.01	2	73.80	1	22.68	2	44.53	1
23.42	2	76.25	2	23.40	1	49.31	3
24.15	2	77.57	1	24.5	2 + br	53.15	1
24.93	2 -	78.68	2	26.8	2 + br	57.07	1
26.74	2	80.14	2	28.87	1	63.75	1
30.35	1	82.85	2	30.92	2	64.25	1
30.66	2	83.21	1	36.43	1	78.68	1
32.46	1	86.35	1	37.00	1 +	86.14	1
38.26	1	87.94	1	42.24	1 +	3002.72	1 +
48.9	1 + br	88.78	1	58.85	2	07.80	1
55.85	1	89.30	2	68.99	1	08.35	1 +
58.00	1 + -	89.46	2	72.68	2	11.30	1
70.30	1 + -	89.85	1	79.60	1	11.52	1

240.53	2 —	3433.70	1	3605.84	1
40.75	2 —	39.13	1	07.69	5 —
43.93	3 —	42.13	2	08.66	5 —
47.80	1	50.73	1	10.49	5 —
48.64	3 —	55.10	1 +	15.53	1
51.27	2 —	60.45	2	19.42	4 —
53.09	3 —	62.88	1	23.96	4 —
54.14	2 —	63.79	1	29.89	3 —
56.25	3 —	65.34	1	35.82	1
58.52	3 —	70.16	1	40.24	1
60.40	3 —	74.20	1	41.56	1
64.83	3 —	74.27	1	58.07	1
67.90	1	83.22	2	58.68	1
68.83	1	88.43	1	60.58	2
70.49	1	88.80	2	69.55	1 +
73.15	1	95.99	1	70.00	1
78.65	2 —	96.96	1	70.67	2
80.90	2	97.66	1	77.13	1
91.10	1	3511.97	1	80.26	1
96.00	1	24.70	1	82.23	1
96.16	1 —	31.94	3 —	84.67	1 +
97.01	2 —	32.20	20 u ¹⁾ —	85.01	1 +
98.35	2	35.40	1	85.36	1 +
3301.10	1	38.13	1	92.96	1
03.40	2	47.91	10 u —	93.83	2
05.06	1 +	48.18	10 u —	94.27	1
07.12	1	48.33	3	96.70	2
08.91	1 —	52.90	1	3700.47	1 +
12.05	2	59.93	1	01.88	2
13.41	2 +	69.61	15 u —	06.23	2
13.70	2	69.95	10 u —	06.81	1 +
14.59	2 +	70.17	4 —	19.06	2
15.07	2 +	76.25	1 + br	32.05	2
16.47	1 +	77.99	10 —	41.19	1 Ti?
16.61	1 +	79.74	1	46.77	1
17.47	3 +	80.3	1 + br	50.90	2
20.82	2	82.54	1	56.77	1
30.80	2	83.79	1	63.50	1
43.85	1 —	85.46	1 +	67.83	1
45.47	1	86.69	5 —	68.30	1 +
51.57	1 —	90.15	1	74.82	1 +
51.89	1	91.05	1	75.07	1

2	3929.79	1	4045.31	3	4147.71	2
2	36.91	1	48.90	8 —	48.96	2
1	43.05	2 +	49.10	2	55.65	1
10 d?	52.12	1	49.56	1	57.12	1
1	53.00	2	51.90	1	76.73	2
1	76.05	1	52.61	2	90.16	2
1	77.25	1	55.36	1	4201.90	1
5 —	80.33	1 +	55.70	4 —	11.90	1
2	81.05	1 +	58.10	3 —	15.13	1
3 —	82.32	1	59.09	4 —	20.79	1
5 —	82.73	2	59.54	3 —	35.41	1
4 —	83.06	1	61.90	4 —	39.90	3
3 —	84.34	1	63.70	5 —	57.83	3
1 +	85.40	2	65.22	2	61.48	1
4 —	86.98	2	66.89	1	66.10	3
8 —	87.26	2	68.17	2 —	78.82	1
1	87.63	1	70.48	4 —	81.30	3
1 —	88.85	1 +	75.40	1	84.25	2
4 —	89.97	1	79.38	3 —	4300.35	2
5 —	90.14	1	79.61	3 —	01.2	1
3 —	91.85	1	83.11	4 —	05.82	1
1 +	92.65	1	83.37	1 +	12.71	4
1	97.36	1 +	83.82	3 —	14.60	1
1	4001.34	1	90.11	2	20.50	1
1	02.07	1	90.76	1	21.31	1
1	02.31	1	92.55	1	23.57	1
1 +	03.44	1 +	95.24	1	26.34	1
1	08.16	1	95.41	1	28.12	1
1	11.68	1	4103.14	1	28.80	1
1	12.05	1 +	03.64	1	29.60	1
1	16.80	1	05.51	2	36.07	1
1	18.28	10 —	08.00	1	37.55	2
1	20.22	1	11.02	2	38.40	2
1	26.07	1	13.41	1	39.01	2
1	26.58	3	14.04	1	56.30	2
1	28.74	1	14.54	1	56.76	2
1	30.92	100 u ¹) —	16.75	1 +	59.90	2
1	31.95	2	22.58	1	69.05	2
1 +	33.21	100 u ¹) —	22.96	1	71.07	2
2	33.72	3	23.49	1	75.11	2
2 +	34.62	50 u ¹) —	23.71	1	77.37	2

24	2	4529.95	1	4619.45	1	4815.3	1	br
66	2	32.48	1	19.78	1	17.1	1	br
04	3	34.61	1	20.4	1	18.50	1	
04	10	38.62	1	21.2	1	23.71	30	
41	1	41.43	1	22.90	1	25.79	1	
93	3	42.61	2	23.50	1	27.08	1	
90	1 (Fe)	44.59	2	24.50	1	28.47	2	
40	1	45.47	1	25.6	1	30.39	1	
23	2	47.53	1	26.69	1	33.39	1	
52	8	48.71	3	27.44	1	41.51	2	
00	1	49.90	1	27.92	1	54.77	1	
05	1	50.0	1	42.50	1	54.99	1	
30	2	53.5	1	42.99	2	62.20	2	
61	1	60.70	1	45.20	1	81.80	1	
78	8	61.3	1	49.20	1	89.00	1	
68	1	62.9	1	56.40	1	1000.96	1	
19	5	63.8	1	57.70	1	07.95	1	
20	5 —	64.2	1	58.60	1	12.56	1	
51	5 —	65.9	1	59.01	1	32.08	1	
02	5 —	71.38	1	59.57	1	66.03	3	
22	4 —	71.71	1	60.98	1	74.59	1	
76	5 —	72.56	1	62.11	1	85.90	1	
48	6 —	72.91	1	63.85	1	3005.03	2	
59	3 —	73.15	1	66.75	1	10.50	1	
30	5 —	73.30	1	71.89	3	17.77	1	
20	10 —	74.67	1	97.09	1	29.99	1	
88	8	75.55	1	4701.31	3	30.81	1	
33	8	77.43	1	09.89	8	42.77	1	
08	8	78.20	1	12.20	1	74.22	1 (Fe)	
59	1	79.83	2	13.3	1	86.95	1	
4	2	82.03	1	14.54	1	1105.71	1	
0	1	82.95	1	27.70	8	18.10	2	
7	5	83.26	1	30.50	1	49.29	1	
1	2	85.10	1	39.30	5	51.10	2	
9	2	86.30	2	54.24	30	96.76	3	
0	1	91.7	1	61.73	6	97.40	1	
7	1	91.9	1	62.60	10	3255.48	4	
9	8	94.28	1	66.08	6	60.91	1	
0	8	95.51	2	66.63	8	89.61	1	
0	1	96.60	1	71.88	1	98.10	1	
0	1	99.14	1	74.30	1	99.02	1	
2	2	4605.52	3	79.30	1	3399.10	1	
3	1	06.56	1	83.62	30	17.26	1	
0	1 —	07.80	1 (Fe)	96.90	1	21.46	2 (Fe)	
5	1 —	11.2	1	97.85	1	41.25	15 (Fe)	
5	1 —	11.6	1	98.5	1	44.60	2	
0	1 —	14.30	1	4207.31	1	48.22	1	
1	1 — br	15.80	1	08.91	1	50.6	2	

9	1 +	5470·88	10 -	5589·03	1	6013·74	20 -
7	1 +	81·61	8 -	94·75	1 +	14·58	1
65	1 +	96·11	1	5602·29	1 +	16·90	30 -
58	1 +	97·57	1	26·50	1 +	22·05	30 -
45	1	5504·41	1	98·6	1 +	57·37	1
86	10	06·10	8 -	5700·75	1 +	78·6	1 +
72	2	13·30	1	18·4	1 + br	6122·4	1 +
89	8 -	14·95	1	20·42	1 +	62·35	1
70	10	17·00	10 -	24·0	1 + br	6265·85	1
80	1 +	20·70	1	26·05	1 +	6332·42	1
67	10 -	33·30	1 +	38·48	2	44·30	1
90	8	36·69	1 +	41·65	1 +	49·94	1
61	10 -	37·99	10 d?	80·39	2	55·29	1
40	1	52·20	3	82·4	1 + Cu?	79·18	1
40	1 +	52·68	1 +	93·1	1 +	82·40	1
75	8 -	56·02	1	5817·01	1	84·88	1 Ni?
65	2	68·02	3	35·55	1 +	6413·77	1 +
90	1	73·24	2	49·11	1	41·14	1
64	3 -	73·93	3	5948·7	1 + br	91·92	2
87	1	75·50	1	74·11	1	6605·7	1 +

XXXIX. Mo. Molybdän.

e Messungen: B. Hasselberg, Akad. der Wiss. Stockholm (1902).
 and Astroph. J. 17 (1903) J. M. Eder und E. Valenta, Wiener Akad. 119
 a (1910) (Rot).

ial: Metall von C. Schuchardt, auf Gaskohle.

reinigungen: Ag, Cu, Mn, Sn, V, Wo.

anzahl: 3390.

07	1	2349·88	1	2398·17	1 +	2454·1	1 +
39	1	51·39	1	2403·69	1	54·3	1 +
06	1	52·69	1	05·95	1	55·05	1
62	1	54·58	1	08·49	1	57·50	1
85	1	55·32	1	15·40	1	57·68	1
30	1 +	64·50	1	16·63	1 +	58·80	1
02	1	72·18	1 +	16·95	1 +	65·65	1
12	1 +	72·37	1	20·35	1	69·16	1
58	1	73·20	1 +	20·63	1	72·05	2
03	1	80·53	1	20·79	1	74·78	1
26	1 +	83·60	1	29·70	1	81·89	2
36	1 +	87·25	1	30·53	1	85·38	1
79	1	89·30	1	30·65	1	97·70	1
55	1	94·85	1	37·79	1	97·85	1
47	1	95·34	1	44·3	1 + br	97·97	1
63	1	97·68	1 +	53·4	1 +	98·37	1

1	2601.47	1	2656.54	1	2712.04	1 +
1	01.80	1	56.63	1	12.80	1 +
1	01.90	1	58.18	2	13.17	1 +
1	02.90	1	58.98	1	13.57	1
1	03.42	1	60.67	2	15.24	1
1	05.17	1	62.92	1	15.65	1 +
1	07.48	2	63.44	1	17.20	1
1	08.97	1	65.18	2	17.40	1
1	10.35	1	65.59	1	17.84	1
1	11.30	2	66.84	1	18.73	1
2	11.75	1	70.41	2	20.26	2
1	12.41	1	71.5	1 +	24.49	1 +
1	13.20	2	71.99	1 +	25.23	2
1	13.84	1	72.95	2	26.04	1
1	15.47	2	73.36	2	26.71	1
2	16.02	1	73.94	1	27.05	1
1	16.85	2	78.75	1	28.40	1
1	17.92	1	79.93	3	28.79	2
1	19.43	1	81.50	1	29.20	2
1 +	20.95	1	81.65	1	29.75	2
3	21.19	2	82.72	1	32.94	2 v
1 +	27.65	2	83.34	2	33.31	1 +
1	28.81	2	84.24	2	33.46	2
2	29.03	1	85.70	1 +	33.90	1
1	29.94	2	86.02	1 +	35.21	1
1	31.59	1	88.08	2	35.74	1
1	34.84	1	88.73	1	35.95	1
1	34.94	1	89.28	1 +	36.99	1
1	35.29	1	90.84	1	37.39	1
2	35.66	1	91.93	1 +	37.95	1
3	36.75	2	92.28	1 +	41.05	1
1	37.45	1 +	92.74	1 +	42.47	1
1	37.58	1 +	93.16	1	42.72	1
2	38.40	2	93.65	1	43.15	1
1	38.83	2	96.15	2	43.25	1
2	39.44	1	97.90	2	43.79	2
1	40.37	1	99.18	1	45.17	2
1	41.11	3	2700.30	2	45.46	2
2	43.89	1	00.83	1	46.41	1
1	44.43	2	01.16	2 d?	46.96	1
1	45.86	1	01.53	2	48.56	1
1	46.56	2	02.72	1	50.25	1
2	47.34	1	02.88	1	50.90	1 +
1	49.33	1	03.10	1	51.59	2
1	49.56	2	05.33	1	52.26	1
1	50.78	1	06.20	2	54.45	1
1	53.45	2	09.33	1	55.46	1
1	55.13	3	09.62	1	56.21	1
1	56.00	1	10.84	1	56.36	1

1	2808.49	2	2849.44	2	2894.59	2
1	09.50	1	50.89	1	95.10	1
1	10.05	1	50.96	1	96.56	1 +
1 +	10.53	1	51.29	1	97.07	1
1	10.76	1	53.01	1	97.74	1
1	11.60	1	53.28	1	98.49	1
2	12.2	1 +	54.95	1	98.76	2
2	14.15	1 +	56.15	1 +	99.15	1 +
2	15.64	1	56.50	1 +	2900.46	1 +
2	15.99	1	56.65	1 +	00.87	1 +
2	16.27	2	56.90	1 +	02.34	1
1	17.02	1	59.21	1	02.73	1
2	17.56	2	59.64	1	03.18	1
1	18.39	1	60.50	1 +	05.36	2
1	20.75	1	62.90	1	06.15	2
1	22.17	1	63.90	1	07.21	1
1	22.55	1	64.39	2	07.60	1
1 + d	22.97	1	64.74	2	07.88	1
1	23.39	1	65.18	1	08.26	1
1 +	24.50	1	65.67	1	09.20	2
2	25.76	1	66.74	1	11.87	1 +
1	26.11	1	67.12	1	12.00	2
2	26.30	1 +	69.67	2	13.61	2
1 +	26.63	2	70.26	1	15.36	1
2 d?	26.81	1	71.01	1	15.46	1
2	27.83	1 +	71.28	1	16.19	1
2	28.05	1 +	71.60	2	18.49	1
1	28.88	1	71.98	1	18.95	1
1	29.90	1	72.95	1 +	19.30	1
1	30.00	1	73.74	1	19.47	1
2	31.10	1	76.61	1	22.00	1 +
1	32.10	1	76.98	1	23.51	2
2	34.51	1	78.45	1	24.40	1
2	34.88	1	79.14	1	24.88	1
1	35.45	1	81.82	1	25.48	1
1	36.01	1	82.66	1	30.54	3
2	36.09	1	84.70	1 +	31.20	1
2	37.07	1	85.86	1	32.20	1
1	37.44	1	86.70	2	34.40	2
1	38.01	1	87.72	1	34.96	1
2	38.61	1	88.64	1	35.28	1 +
1 +	39.68	2	88.73	1	36.59	1
2	41.37	1	89.98	1	37.75	1
1	42.25	2	90.6	1 +	38.87	1
1	42.48	2	91.12	2	40.14	1
1 +	43.00	1	91.40	1	41.09	1
1 +	43.83	1	92.70	1	42.97	1
1	44.50	2	92.97	1	44.81	1
2	48.31	2	93.36	1	45.50	1

2	3003-29	1	3061-07	1	3099-66	1
2	04-26	1	61-71	2	3100-04	2
1	07-80	1 +	62-55	1	01-00	2
1	08-23	2	64-40	3	01-45	3
1	09-75	1 +	64-6	1 +	02-00	1
1	10-39	2	65-18	3	04-02	1 +
1 +	11-66	1	66-50	1 Va?	04-15	1 +
1	13-51	2	68-11	2	04-51	1
1	13-90	3	68-75	1	06-46	2
1 +	14-80	2 d?	69-13	2	07-00	1 +
1	16-88	2	69-61	1	07-35	1
1	23-12	2	69-90	1	08-10	1
1	23-80	1	70-09	1	08-20	1
1	25-11	2	71-03	2	10-75	1
1	27-86	1	71-55	2	11-34	1
2 (Fe)	31-30	1	73-50	1	12-23	5
1	32-65	1 +	74-50	3	13-12	1
1	33-35	1 +	75-05	1	13-8	1 +
1	33-60	1 +	75-75	1	15-00	1
1 +	35-05	1 +	76-96	1	15-43	1
1	35-44	2	77-50	1	15-83	1
1	36-40	2	77-78	1	16-18	1
2	38-87	1	78-10	1	16-86	1
1	39-91	2	78-37	1	17-64	1
1 +	41-81	3	80-00	2	18-89	1
1 +	43-06	1	80-52	2	19-93	1
2	43-14	1	81-27	2	20-85	1
1	43-80	1	82-06	1	22-14	1
1	43-97	1	84-35	1	22-57	1
2	44-80	1	85-71	3	23-16	1
1	45-13	1	86-47	1	23-49	1
1	45-30	1	86-98	1	23-73	1
2	46-90	2	87-73	2	25-15	1 +
2	47-16	1	88-44	1	27-13	1 +
2	47-40	2	89-24	2	28-98	1
2	47-94	1	89-84	2	29-45	1
1	49-43	1 +	90-76	1	31-33	1 +
1	50-33	1 +	91-96	1	32-70	30 n
1	52-65	1	92-21	2	33-95	1
1 +	53-13	1	92-83	2 (Al)	34-63	1
1	53-40	1	93-49	1	35-69	1
1	53-74	1	93-80	1	36-00	2
1	55-40	2	93-93	1	36-52	2
1	55-84	1	94-80	3	36-86	2
1	56-82	1	95-81	1	37-95	1 +
1 Fe?	57-66	2	97-31	2	38-45	1
1	58-69	1	97-50	1 +	38-80	1
2	59-80	1	98-57	1	39-97	2

2	3183·15	2	3219·63	1 +	3260·33	1
1	83·44	1	21·01	2	60·65	2
1	84·17	1 +	21·89	2	61·33	1
2	84·55	1 +	23·64	2	61·96	1
1	84·71	2	24·55	1	62·80	3
1	85·23	2	26·91	1	63·20	1
2	85·82	2	28·36	3	63·99	2
2	86·49	1	28·82	1	64·59	3 d?
2	87·39	1	29·06	1	65·29	2
3	87·77	2	29·93	3	66·32	2
1	88·20	2	30·65	1	66·45	2
1	88·51	2	30·92	1	67·26	2
2	89·37	1	31·25	1	67·77	1
1	89·88	1	32·40	1	68·33	2
2	90·36	1	32·75	1	71·04	3
2	91·15	1	32·87	1	71·79	1
2	91·64	1	33·33	4	73·00	1
1 +	92·24	1	34·30	1	73·20	1
10 u	92·92	2	35·00	1	75·70	1
1	94·11	20 u	35·54	2	76·17	1
2	94·99	1	36·00	1	76·49	1
1	95·33	1	36·54	1	76·95	1
1	96·09	2	37·21	4	77·26	1
1	96·70	1	38·13	2	78·76	1
1	97·30	1	39·86	1	79·57	2
1	98·53	1	40·63	2	80·41	1
1	98·99	2	40·82	1	81·20	2
2	3200·32	2	41·56	1	81·49	1
3	00·82	1	44·62	2	82·60	1
1 +	01·02	2	45·07	1	83·50	2
1 +	01·60	1	46·09	2	84·38	1
1 +	02·23	2	46·45	1	84·71	1
1	05·39	2	47·76	3	85·16	2
1	05·70	2	49·33	1	85·50	2
20 u	06·08	3	50·09	2	86·12	1
1	08·98	10	50·90	1	86·81	1
1	10·51	1	51·49	1	87·08	1
2	10·77	1 d	51·81	2	87·34	1
2 d?	11·12	2	52·08	1	87·54	2
1	11·66	1	53·67	1	87·90	1
3 d	12·76	2	53·94	1	89·12	4
1	13·47	2	54·83	2	90·00	3
2	14·59	2	55·27	1	90·58	1
2	15·20	2	55·92	1 +	90·99	4
2	15·42	1	56·34	3	91·74	2
2	16·57	1	56·85	1	92·45	2
1	16·90	1	58·83	1	93·82	2
1	18·65	2	59·30	2	94·00	1
1	19·40	1	59·69	1	95·00	2

1	3329.28	1	3367.75	1	3404.50	4
2	31.54	2	68.10	1	04.99	1
2	32.80	1	68.26	1	05.33	1
1	33.06	1	69.38	2	05.75	1 +
1	33.48	1	70.07	1	06.10	5
1	35.11	1	72.20	1	07.44	1
1	35.22	1	73.05	1	07.73	1
1	35.64	1	73.27	1	08.75	1
1	36.20	1	73.95	2	09.96	1
1	36.66	2	74.74	1	11.23	1
1 +	37.58	1	74.85	1	12.16	1
1	38.26	1	74.95	1	12.43	1 +
3	38.57	1	75.35	2	13.50	2
1	39.50	1 +	75.76	2	13.81	2
3	40.34	3	76.88	1	14.24	1 +
3	42.02	1	77.05	1	14.91	1 Ni?
3	43.91	2	77.75	1	15.04	1
2	44.90	6	78.31	2	15.40	1
3	45.69	1	78.59	2	15.75	1
1	46.55	1	80.20	5	16.16	1
1	47.17	6	81.26	1	16.26	1
1	47.92	1	81.93	1	16.70	1
2	48.20	1	82.45	2	16.80	1
1	49.33	2	82.66	4	17.63	1
2	50.16	1	83.71	1	18.48	1
1	50.50	3 d	84.80	6	18.69	3
1 +	51.28	1	85.36	1	19.09	2
1	51.67	1	86.00	2	19.82	1
1	53.50	1	87.90	2 d	20.21	3
1	53.65	1	88.33	1	21.41	3
1	54.26	2	88.56	1	21.95	1
1	54.63	1	88.85	1	22.47	2
1 +	54.93	1	89.05	1	23.15	1
2	55.15	3	89.92	2	23.45	1
2	56.50	1	90.25	1 +	24.74	2
1	57.82	1 +	91.20	1	24.92	2
1	58.26	8	91.67	1	25.32	2
1	59.34	1	92.31	2	25.64	2
1	59.66	1	93.80	2	26.15	2
1	61.52	4	95.75	1	26.93	2
4	61.99	1	96.70	1	27.65	1
1	62.51	3	96.96	1	28.05	2
1	62.90	1	97.10	1	28.99	1
4	63.98	8	97.83	2	30.36	1
1	64.98	1 +	99.03	1	31.81	1
4	65.51	1	3400.26	1	33.05	2
1	65.68	1	02.41	1	33.55	1
1	67.29	1	02.95	1	34.20	2
2	67.50	1	03.48	2	34.64	1

02	3	3466·34	1	3504·60	4	3540·72	1
40	1	66·96	2	05·45	2	42·30	5
57	3	67·09	2	05·66	1 +	42·90	1
00	1	67·99	2	07·16	1	43·25	1
34	4	68·65	1	07·44	1	43·80	1 +
77	2	68·97	1	08·25	3	44·74	1
22	1	69·07	1	08·60	1	45·02	1 +
22	1	69·36	2	10·12	1	47·25	1
66	1	69·76	1	10·92	2	47·54	1
66	1	70·35	1	11·93	1	48·01	1
88	1	70·70	1	13·86	2	48·58	1 +
11	2	71·07	2	14·36	1	48·85	1 +
11	1 +	71·74	1	14·90	2	49·25	1
00	2	73·35	2	15·27	1	51·10	1
22	3	74·10	1	15·91	1	51·74	1
33	2	74·35	1	17·69	3	52·51	1
66	2	74·44	1	18·35	3	52·86	2
00	1	74·78	1	18·69	1	53·99	1
00	1	75·19	2	20·49	1	54·34	2
99	10	75·65	1 +	20·73	1	55·56	2
55	1	76·96	1	21·17	1	55·77	1
44	1	77·68	1	21·28	1	56·84	1
55	1	79·59	3	21·57	3	57·09	1
00	4	80·25	2	22·48	2	57·60	1
33	1	81·94	2	23·45	1	58·23	2
88	2	82·58	3	24·32	3	58·34	1
88	1	83·81	2	24·74	3	58·96	1
00	2	84·02	2	25·62	3	59·40	1
44	2	85·64	1	26·06	1	59·70	1
22	1	86·10	2	26·44	1	60·26	2
33	1	87·47	1	26·66	1	61·04	1
66	2	87·65	1	27·49	1	61·33	1
44	1	89·56	1	28·87	1	61·42	1
77	2	90·44	1	29·50	1	61·81	1
33	4 d?	91·30	1	30·94	1	62·25	2
00	1	91·50	1	31·41	2	62·96	1
77	2	91·99	2 d	31·7	1 +	63·32	3
55	2	93·00	1	34·10	1	63·90	2
99	2	93·09	1 Ni?	34·83	2	64·45	2
22	3	93·48	2	35·40	1	66·20	2
33	1	95·14	1	35·93	1	66·55	1 +
88	1	96·83	2	36·27	1	66·90	1
55	1	98·20	1	37·42	3	67·21	1
33	1	99·05	1	39·05	1	67·64	1
55	1	99·36	1	39·24	1	67·90	1
44	1	3501·46	1 +	39·62	1	68·22	1
77	1	02·10	1 +	40·14	1	68·30	1
00	2	02·50	1	40·34	1	68·66	1
99	2	03·65	1	40·59	1	69·04	1

1	3603·11	3	3641·54	1	3676·13	1
1	03·77	1 +	41·95	1	76·38	1
1	03·87	1 +	42·37	1	77·84	1
2	04·22	2	42·56	1	79·12	1
2	04·70	1	42·89	1	79·36	1
1	05·17	1	43·6	1 + br	80·34	1
1	05·55	1 +	44·45	1	80·81	4
3	06·40	1 + d	45·74	1	81·02	1
2	07·55	1	47·01	1	81·45	1
1	08·52	3	48·77	2	81·70	1
1	09·65	2	50·34	1	81·88	1
1	10·77	1	50·74	1	82·10	1
1	11·34	1	51·25	1	82·85	1
1	12·16	2	51·52	2	84·06	1
1	12·61	2	53·84	1	84·50	1
1	13·51	2	54·04	1	85·95	1
2	13·80	2	54·73	2	86·27	1
1	14·43	5	55·20	1	86·74	1
4	14·85	1 +	57·52	3	87·14	1
1	15·28	1	58·30	1	88·13	1
1	15·86	2	58·50	1	88·45	1
1	16·20	1	59·53	4	89·11	2
1	16·98	2	61·10	2	90·29	1
2	17·32	1	61·25	1	90·78	1
1	19·49	1 Ni?	61·95	2	92·25	1
1	21·78	1	62·33	1	92·80	1
1	22·20	1	63·16	2	93·53	1
2	22·51	1	63·45	2	94·78	1
1	23·40	3	63·85	1	95·13	4
2	24·62	3	64·14	1	95·69	1
1	24·77	3	64·48	2	96·20	1
2	25·16	1	64·99	3	97·39	1
1	25·80	1	65·90	2	98·31	1
1	26·36	3	66·87	2	98·68	1
1	28·50	2	67·12	2	99·26	1
1	28·81	2	67·47	1	3700·19	1
2	29·42	3	67·84	1	01·70	1
2	33·0	1 + br	68·17	1	02·21	1
1	35·25	2	68·46	1	02·35	1
1	35·58	3	68·66	1	02·69	1
1	35·73	2	69·51	2	05·60	1
1	36·95	1	70·55	1	05·75	1
3	37·63	2	71·81	1	07·33	1
1	38·32	2	72·05	1	08·20	1
1	38·60	1 +	72·99	3	08·72	1
2	39·12	1	73·36	1	10·31	1
1	39·66	1	74·03	1	11·65	1
1	40·78	2	75·05	1		

3713·10	2	3752·76	1	3786·11	1	3821·05	1
13·61	2	53·75	1	86·33	1	21·33	1
14·70	2	55·29	2	86·52	1	21·81	1
15·35	1 +	55·66	1 +	88·39	2	22·10	1
15·80	3	55·98	1	92·27	1 +	22·46	1
16·20	2	56·48	1	92·47	1	23·13	3
17·00	2	58·69	2	93·78	2	23·94	1
18·60	1	59·75	1	94·59	2	24·31	1
19·70	2	60·20	1	95·46	1	24·94	1
19·79	1	60·28	1	95·92	1	25·07	1
20·39	2	61·04	2	96·18	1	25·46	1
22·45	1	61·92	2	96·44	1	25·60	1
23·36	1	62·23	1	96·85	1	26·85	4
23·65	2	62·95	1	97·20	1	27·30	2
23·95	2	63·50	2	97·46	1	28·35	1
24·47	1	64·59	1	98·41	50 u	28·55	1
25·32	1 +	65·19	1	3800·21	1	29·02	4
25·70	2	65·40	2	01·09	1	29·94	1
26·39	2	65·72	1	02·00	3	30·05	1
26·71	1	65·90	1	02·31	1	30·19	1
28·41	2	66·55	1	03·16	1	30·52	1
28·61	2	67·90	1	03·95	1	30·95	1
30·68	1	68·80	1	04·66	2	31·20	1
31·78	1	68·90	1	05·22	1	31·60	1
32·87	3	69·28	1	06·11	2	31·90	1
33·15	2	70·16	1	06·84	1	32·24	2
33·85	1	70·64	5	07·12	1	33·3	1 +
34·47	2	71·60	1	07·53	1	33·88	5
35·74	1	72·12	3	07·75	1	34·75	1
36·03	1	72·99	2	08·01	1	35·10	1
36·29	1	73·52	1	08·76	1	35·43	2
38·02	2	75·80	1	09·26	1 +	36·66	1
39·00	1 +	76·25	1	10·27	1	37·03	1
39·26	1 +	76·71	1	10·70	1	37·99	1
40·67	1	77·19	1	10·95	1	38·43	1
40·93	1	77·50	1	11·55	2	39·33	1 +
41·25	1 +	77·86	1	12·60	2	39·60	1
42·41	2	78·10	1	14·05	1	41·85	1
43·94	1	79·64	1	14·25	1	42·10	1 +
44·24	1	79·91	2	14·65	1	43·11	1
44·51	2	80·79	1	15·00	1	44·03	1
45·07	1	81·37	1	15·21	1	44·35	1
45·55	1	81·78	3	17·30	1	45·17	1
46·04	2	82·35	1	17·49	1	45·57	1
47·34	2	82·84	1	18·14	1	46·09	2
48·65	2	83·69	1	18·39	1	46·28	2
51·35	2	84·60	1 +	18·81	2	47·40	3
52·10	1	85·18	2	19·17	1	48·42	3
52·52	1	85·66	2	19·99	2	49·16	1

04	1 +	3900-80	1	3938-84	1	3980-86	1
04	1	01-93	3	39-35	1	81-84	1
14	2	02-45	1 +	39-60	1	81-95	1
55	1	03-11	30 u	40-46	1	82-24	2
57	1 +	04-64	1	41-63	1	82-78	2
53	1 +	04-95	1	41-90	1	84-95	1
75	1 +	07-10	2	42-30	1 +	85-89	1
78	1	08-40	1	43-20	4	86-43	3
12	1	08-53	1	43-65	1	87-15	1
33	1 +	09-70	1	44-86	1	87-55	1
33	1	11-25	1	45-39	2	90-10	1
46	1	11-35	1 +	46-98	1 + d	91-56	1
65	1	12-11	1	47-30	2	92-05	1
30	50 u	12-29	1	47-64	1	92-99	1
29	1	12-70	1	48-76	1	93-23	1
86	1	13-53	1	50-40	1	94-12	1
94	1	13-66	1	51-15	2	94-51	1 +
81	1	13-81	1	51-49	1	94-80	1 +
60	1	15-19	1	51-67	1	95-65	1 +
96	1	15-56	2	52-43	1	96-47	1 + d
23	3	15-75	1	52-70	1 +	98-45	1
60	1	16-56	1	53-15	1 +	4000-62	4
77	1	17-05	2	54-05	2	01-87	1
20	1	17-65	2	55-63	2	03-61	1
93	1	17-89	2	57-78	1	04-52	1 +
32	2	19-45	1	58-13	1	05-04	1 +
15	1	21-06	1	58-75	2	05-90	1
65	1	21-47	1	58-98	1	06-21	2
10	1	21-93	1	59-49	1	06-85	1
67	1	22-46	2	59-83	1	07-60	1
98	3	22-81	1	60-10	1	08-20	2
84	1	23-90	2	62-25	1	08-94	1 Wo?
11	1	24-76	1	63-68	1	09-53	2
35	2	26-33	1	64-15	1	10-30	1
00	2	26-50	1	65-04	1	11-86	1
43	1	26-57	1	65-46	1	12-14	2
12	1	28-44	1	65-90	2	12-42	1
60	1	28-85	1	66-29	1	12-66	1
86	1	28-93	1	68-91	2	12-95	1
26	1	30-16	1	70-95	1	16-82	1
00	1 +	31-54	1	71-13	1	17-50	2
45	1	32-75	1	73-14	1	18-30	1 + d
50	1	34-36	1	73-94	2	19-28	1
52	1	35-10	1	74-09	2	20-60	1
75	1	35-29	1	76-10	2	20-80	1
99	1	35-80	1	76-75	1 + br	21-15	2
65	1	36-25	1	78-05	1	24-23	3
10	1	36-83	1	79-37	1	25-37	1
38	1	38-53	1	80-36	2	25-64	1

5	2 + r	4075.40	3	4120.85	1	4170.90	1 +
5	1	75.71	2	22.55	1	71.29	2
6	2	76.10	2	23.81	3	71.65	1
9	1 +	76.34	3	24.70	3	74.27	1 +
8	1 +	76.70	1	26.69	2	75.30	1
5	1 +	77.85	2	27.80	1	77.09	1
5	2	78.21	1	28.41	3	77.43	3
7	2	78.51	1	28.98	2	78.44	3
1	2	79.27	1 +	29.84	1	78.70	1 +
1	1	79.50	1	30.25	1	80.15	1
1	1	81.62	5	32.13	3	80.70	1
6	2	81.95	2	32.37	3	81.25	3 +
2	2	82.70	1	33.10	1	83.26	1
3	3	83.87	1	35.55	1 +	84.4	1 +
4	1	84.59	6	37.10	1	84.57	2 +
9	1	85.67	1	38.35	1	85.99	5
6	1	86.18	3	38.70	1	86.44	2
1	2	87.63	1	39.68	1	87.74	1
0	1	87.91	1	42.25	1	88.49	10
5	1	88.78	2 + br	42.33	1	90.18	3
8	1 +	89.89	1	43.73	8	90.65	1
2	1 Wo?	90.57	1	45.75	1	92.37	1
5	1 d	91.06	1	46.64	1	94.1	1 + br
5	1	93.33	1	47.90	1	94.73	4
0	1	94.61	1 d	48.45	1	97.20	1
5	1	95.46	1	48.85	1	97.53	1
5	2	96.61	1	49.12	3	98.75	1 +
2	1	96.99	4	49.55	1	99.77	1 +
5	1	97.85	1	49.86	1	99.97	1 +
0	1	98.34	2	51.57	1	4200.32	1 +
5	1	98.90	4	52.07	2	00.72	2
7	1 +	4102.34	5	53.36	1	01.47	3 +
5	1	03.92	1	55.49	4	03.27	1
3	1	05.24	4	55.76	4	04.86	2
3	3	05.69	2	56.95	2	05.98	3
0	2	07.68	8	57.58	4	07.38	1 +
2	1 +	08.25	2	58.20	2 +	07.55	1 +
7	2	10.45	1	60.43	1 +	07.68	1 +
0	1	10.87	1	61.05	1	08.96	1
7	3	11.10	1 +	62.85	3	09.84	1
5	2 + br	11.96	1 + Va?	64.26	2	10.50	1
6	6	12.29	1 +	65.1	2 + br	11.19	3
5	1	13.76	1	65.58	1	14.22	1
5	1 d	15.09	2	65.95	1	15.18	1 +
3	2	16.1	1 +	66.47	2	16.99	1
3	1	16.45	1	67.54	1	19.15	1
6	1	19.11	3	68.68	2	19.51	2
0	1	19.77	1	70.01	2	22.06	2

3849.94	1 +	3900.80	1	3938.84	1	3980.86	1
51.54	1	01.93	3	39.35	1	81.84	1
52.14	2	02.45	1 +	39.60	1	81.95	1
52.55	1	03.11	30 u	40.46	1	82.24	2
52.67	1 +	04.64	1	41.63	1	82.78	2
53.63	1 +	04.95	1	41.90	1	84.95	1
54.75	1 +	07.10	2	42.30	1 +	85.89	1
55.78	1	08.40	1	43.20	4	86.43	3
56.12	1	08.53	1	43.65	1	87.15	1
57.33	1 +	09.70	1	44.86	1	87.55	1
57.83	1	11.25	1	45.39	2	90.10	1
58.46	1	11.35	1 +	46.98	1 + d	91.56	1
62.65	1	12.11	1	47.30	2	92.05	1
64.30	50 u	12.29	1	47.64	1	92.99	1
65.29	1	12.70	1	48.76	1	93.23	1
66.86	1	13.53	1	50.40	1	94.12	1
66.94	1	13.66	1	51.15	2	94.51	1 +
67.81	1	13.81	1	51.49	1	94.80	1 +
68.60	1	15.19	1	51.67	1	95.65	1 +
68.96	1	15.56	2	52.43	1	96.47	1 + d
69.23	3	15.75	1	52.70	1 +	98.45	1
70.60	1	16.56	1	53.15	1 +	4000.62	4
70.77	1	17.05	2	54.05	2	01.87	1
73.20	1	17.65	2	55.63	2	03.61	1
73.93	1	17.89	2	57.78	1	04.52	1 +
74.32	2	19.45	1	58.13	1	05.04	1 +
79.15	1	21.06	1	58.75	2	05.90	1
79.65	1	21.47	1	58.98	1	06.21	2
83.10	1	21.93	1	59.49	1	06.85	1
85.67	1	22.46	2	59.83	1	07.60	1
86.98	3	22.81	1	60.10	1	08.20	2
87.84	1	23.90	2	62.25	1	08.94	1 Wo?
88.11	1	24.76	1	63.68	1	09.53	2
88.35	2	26.33	1	64.15	1	10.30	1
89.00	2	26.50	1	65.04	1	11.86	1
89.43	1	26.57	1	65.46	1	12.14	2
90.12	1	28.44	1	65.90	2	12.42	1
90.60	1	28.85	1	66.29	1	12.66	1
90.86	1	28.93	1	68.91	2	12.95	1
91.26	1	30.16	1	70.95	1	16.82	1
92.00	1 +	31.54	1	71.13	1	17.50	2
92.45	1	32.75	1	73.14	1	18.30	1 + d
93.50	1	34.36	1	73.94	2	19.28	1
96.52	1	35.10	1	74.09	2	20.60	1
96.75	1	35.29	1	76.10	2	20.80	1
96.99	1	35.80	1	76.75	1 + br	21.15	2
97.65	1	36.25	1	78.05	1	24.23	3
98.10	1	36.83	1	79.37	1	25.37	1
3900.38	1	38.53	1	80.36	2	25.64	1

4026·15	2 + r	4075·40	3	4120·85	1	4170·90	1 +
27·05	1	75·71	2	22·55	1	71·29	2
28·76	2	76·10	2	23·81	3	71·65	1
28·99	1 +	76·34	3	24·70	3	74·27	1 +
29·68	1 +	76·70	1	26·69	2	75·30	1
30·05	1 +	77·85	2	27·80	1	77·09	1
32·65	2	78·21	1	28·41	3	77·43	3
33·77	2	78·51	1	28·98	2	78·44	3
34·11	2	79·27	1 +	29·84	1	78·70	1 +
35·81	1	79·50	1	30·25	1	80·15	1
36·81	1	81·62	5	32·13	3	80·70	1
37·46	2	81·95	2	32·37	3	81·25	3 +
37·92	2	82·70	1	33·10	1	83·26	1
38·23	3	83·87	1	35·55	1 +	84·4	1 +
39·14	1	84·59	6	37·10	1	84·57	2 +
40·79	1	85·67	1	38·35	1	85·99	5
41·26	1	86·18	3	38·70	1	86·44	2
43·01	2	87·63	1	39·68	1	87·74	1
43·40	1	87·91	1	42·25	1	88·49	10
43·85	1	88·78	2 + br	42·33	1	90·18	3
45·28	1 +	89·89	1	43·73	8	90·65	1
45·72	1 Wo?	90·57	1	45·75	1	92·37	1
47·05	1 d	91·06	1	46·64	1	94·1	1 + br
47·35	1	93·33	1	47·90	1	94·73	4
47·70	1	94·61	1 d	48·45	1	97·20	1
49·75	1	95·46	1	48·85	1	97·53	1
50·25	2	96·61	1	49·12	3	98·75	1 +
50·62	1	96·99	4	49·55	1	99·77	1 +
51·35	1	97·85	1	49·86	1	99·97	1 +
52·10	1	98·34	2	51·57	1	4200·32	1 +
52·45	1	98·90	4	52·07	2	00·72	2
52·67	1 +	4102·34	5	53·36	1	01·47	3 +
54·95	1	03·92	1	55·49	4	03·27	1
55·73	1	05·24	4	55·76	4	04·86	2
56·18	3	05·69	2	56·95	2	05·98	3
56·50	2	07·68	8	57·58	4	07·38	1 +
57·62	1 +	08·25	2	58·20	2 +	07·55	1 +
57·77	2	10·45	1	60·43	1 +	07·68	1 +
59·40	1	10·87	1	61·05	1	08·96	1
59·77	3	11·10	1 +	62·85	3	09·84	1
60·4	2 + br	11·96	1 + Va?	64·26	2	10·50	1
62·25	6	12·29	1 +	65·1	2 + br	11·19	3
64·35	1	13·76	1	65·58	1	14·22	1
64·75	1 d	15·09	2	65·95	1	15·18	1 +
66·53	2	16·1	1 +	66·47	2	16·99	1
67·13	1	16·45	1	67·54	1	19·15	1
67·86	1	19·11	3	68·68	2	19·51	2
69·00	1	19·77	1	70·01	2	22·06	2
70·12	10	20·29	8	70·54	1	23·10	2

4224·07	1	4282·00	2	4329·80	2	4373·73	1 +
24·90	1 +	82·62	1	30·25	2	75·19	10
25·10	1 +	83·46	1	31·56	1	76·85	2
26·46	1	84·79	5	32·70	1	77·91	1
28·95	1	85·76	1	32·95	1	80·49	4
29·69	1	87·23	4	33·41	1	80·79	2
31·83	1	88·43	1	34·12	1	81·35	2
32·82	10	88·82	10 r	34·66	1	81·85	15
33·65	2 +	89·58	3	35·00	3	82·56	2
34·13	1	90·40	4 +	36·37	1	84·36	2
35·22	2	91·40	3	38·85	2	86·04	2
37·33	3	91·86	1	39·39	2	87·49	1
39·29	4	92·37	10	40·00	2	88·50	1
40·22	3	93·42	10	40·90	3	89·74	1
40·46	3	94·03	10	41·58	3	91·70	3
41·01	4	96·34	2	42·14	1	92·30	3
42·95	2	96·80	2	44·26	1	93·91	2 +
44·96	1	97·80	1	44·80	2	94·53	2
46·19	4	99·06	2	45·82	1	94·66	2
49·68	1	4300·04	1	46·32	2	96·55	1
51·57	1	01·44	2	47·03	1	96·88	4 r
52·02	4	02·10	1 +	47·64	1 +	97·46	4 r
52·66	1	04·20	2	49·34	1	98·66	1
53·75	2	04·82	1	50·52	8	99·39	1
55·10	3	05·09	2	51·26	1 +	4400·83	1
56·97	1	06·82	1	51·70	1	01·43	1 +
57·18	1	08·83	1	53·04	1 +	02·67	2
58·84	2	10·58	3	53·46	3	03·08	3
60·52	2	12·97	2	54·85	1	04·67	2
60·85	2	13·16	2	57·51	2	05·18	1
61·15	1	13·74	1	58·00	1	07·03	1
61·62	2	15·27	1	58·70	2	08·98	1
63·26	1	15·56	1	59·79	2	09·59	2
64·79	2	15·98	1	61·28	1	10·10	3
65·27	2	16·54	1	61·60	1	11·86	20
66·35	3	17·40	1 +	62·21	2	12·91	4
68·24	3	18·09	3	62·89	2	13·82	1
69·47	4	18·40	1 +	63·19	1	14·52	1
72·24	1	18·77	1 +	63·83	1	15·54	1
73·25	4	19·68	1 +	64·67	3	15·84	1
74·21	1	21·95	1	64·86	2	17·07	1 +
75·84	2	22·16	3	66·09	1	17·37	1
77·10	4	22·65	1	66·71	3	19·89	1
77·49	10 d	24·70	1	68·05	1	20·90	1
78·74	1	25·45	1	68·96	1	21·6	1 + br
79·16	1	26·29	8	69·25	10	22·24	2
80·19	1	26·90	5	70·33	1	23·03	1
81·06	1	28·86	1	72·30	2	23·25	1
81·35	1	29·52	1	73·53	2	23·81	10

4424:36	1	4477:33	1	4541:74	2	4601:09	1
26:86	5	79:17	1	43:05	1	01:60	1
28:35	1	81:46	1	45:23	1	03:75	1
29:27	1	85:15	5	46:75	1 +	04:32	1
31:04	1	85:93	1 +	47:35	1 +	06:35	1
33:05	1	87:21	4	47:70	1 +	06:71	1
33:68	1	89:17	2	48:00	1 +	07:28	2
35:19	10	90:39	3	49:33	1 +	08:28	1
36:85	1 +	91:48	5	49:60	1	08:85	2
37:05	3	91:85	1	53:00	1	10:04	10
37:21	2	92:25	1 +	53:43	4	11:00	1
37:60	1	94:26	1	53:97	2	11:36	2
39:12	2	96:33	1	56:22	1	12:15	1
39:68	1 +	99:60	3	58:29	4	12:40	1
40:35	1	4501:48	4	58:93	2	13:46	1
40:88	1	03:65	1 +	59:93	1	14:91	1
42:37	8	04:63	1 +	60:30	3	15:63	1
43:26	5	05:08	1 +	65:88	1	16:78	2
44:20	2 +	06:19	5	67:05	1	17:80	1
44:61	1	06:85	3	67:54	1	18:12	2
44:90	1	08:35	1	67:87	3	19:88	1 +
46:59	3	12:35	5	69:19	2	21:53	5
46:94	1	14:56	1	70:30	3	22:75	1
47:40	1	15:31	3	70:79	1 Wo?	23:63	2
49:93	10	17:29	4	71:25	2 +	24:40	3 +
52:74	2	17:59	3	72:00	2 +	26:62	10
54:04	1	18:60	1	74:72	2 +	27:67	5
54:93	1	21:32	1	75:35	1 +	28:59	1
55:46	1	21:75	1	76:05	2	28:90	1
57:55	10	22:38	3	76:67	8	30:20	2
58:24	1	23:75	1	77:94	2	31:10	1
58:83	2	24:50	5	78:65	1	31:72	1
60:80	3	24:85	1 +	79:87	1	32:73	1
61:70	1 +	25:49	1	82:53	2	33:27	3
62:00	1 +	26:03	1	82:65	2	33:83	1
63:67	1	26:52	4	84:63	1 +	35:20	1
64:66	1	28:05	1	86:22	2	37:93	1
64:94	3	28:74	3 +	86:74	1	38:55	1
67:61	1	29:53	4	86:94	1	39:57	1
68:42	10	33:45	1	87:59	1	41:10	1
69:55	1	34:60	2	88:30	1	41:75	1
71:21	1	35:09	2	89:5	1 + br	42:88	2
71:82	3	35:53	2	90:53	3 +	44:40	1 +
72:20	3	35:67	2 +	92:39	2	45:57	1
72:77	1	36:98	5	93:82	1	46:52	1 +
73:39	5	38:55	1	95:32	5	46:65	1 +
74:80	10	39:16	1	98:04	2	48:00	3
75:43	1	39:76	1	98:40	2	49:26	2
75:80	3	40:97	1 +	99:31	3	51:25	2

4652:53	2 + br	4716:84	1	4795:57	1 +	4885:50	1
53:82	1	18:10	4	96:70	3	85:84	1
56:22	1	19:09	2	4801:20	1 +	86:67	2
56:51	1	23:23	1 +	05:10	1	87:40	1
57:67	1	23:60	1 +	05:73	2	89:40	2
58:75	1	25:54	1	08:25	2	94:60	1
60:07	2	29:31	3	08:66	1	95:14	1
62:11	3	30:57	1	11:26	3	96:63	1
62:93	4	31:62	10	12:65	1 +	97:47	2
63:30	1 +	34:30	1	13:34	1 +	99:77	1
65:59	1	35:49	1	14:25	1 +	4900:65	1
68:99	1	36:79	1	14:64	1	04:01	3
69:80	1	40:55	1 +	17:10	1 +	04:60	1
70:22	1	43:25	1	17:87	2	07:61	2
70:63	1	43:80	1 +	19:40	5	09:39	2
71:43	1	48:67	1	22:60	1	12:4	1 + br
72:09	3	49:03	1	23:12	1 +	16:40	1
73:28	1	50:60	3	27:63	1 +	17:52	1
74:01	1	51:31	1	28:60	2	18:35	1 + br
75:90	1	53:55	1	30:10	1	22:78	1
77:86	1 +	55:18	1	30:68	4	23:15	1
78:40	1	55:50	1	33:01	2	23:55	1
80:73	2	56:06	1	34:10	2	23:67	1
81:26	1	57:35	1	35:90	1	25:01	1
81:83	1	57:74	1	38:26	1	26:40	2
82:18	1	58:67	4	39:70	1	26:63	2
82:45	1	59:85	1	45:31	1	27:23	1
84:02	2	60:35	10	46:80	1 +	28:50	1
84:56	1	61:30	1 +	47:40	1 +	31:37	1
86:04	1	63:00	1	48:30	1 +	32:20	1 +
86:33	1	64:60	3 v	50:00	1 +	32:50	1 +
88:41	3	71:05	1	51:63	1 +	33:30	3
89:67	1	73:57	4	51:87	1 +	33:55	2
90:36	1	74:40	2	54:67	1	33:95	1
91:09	2	75:82	3	55:91	1	37:60	1
92:20	1	76:49	3	58:42	3	39:89	1
92:90	1	78:03	1	60:25	2	41:87	3
93:56	1	83:09	3	60:80	1 +	42:56	1
94:11	2	84:60	1	60:99	1 +	44:05	1
96:06	1	85:30	3	66:02	1	45:46	1
96:70	1	86:61	2	68:21	5	47:50	1
99:00	1 +	87:80	1	68:96	1 +	49:20	1
4700:68	2	88:34	1	69:40	3	50:81	3
01:79	1	89:50	1	75:30	1	52:13	1
06:27	8	92:00	1	78:56	2	53:95	1
07:43	10	92:93	3	81:01	1	56:02	1 +
08:40	6	93:60	3	82:09	1	56:73	1
10:20	1	94:01	2	84:53	1	59:82	1
14:68	2	94:80	1	85:15	1	60:50	1 +

4961.00	1	5029.50	1	5097.71	4	5193.92	1 +
61.68	1	30.98	3	98.23	2	96.25	1 +
63.11	1	32.55	1	99.23	1	97.10	1 +
64.40	2	33.60	1	5100.54	1	98.80	1 +
64.60	2	34.35	1	02.40	1 +	5200.32	4
66.67	1	37.36	1	04.90	1 +	00.91	3
68.80	1	37.70	1	09.45	1	04.11	1
69.83	1	39.09	2	09.89	3	10.60	2
70.0	1 + br	42.80	1 +	10.58	2	12.03	3
70.56	1	44.6	1 + br	15.13	3	19.59	3
70.95	1	45.55	1 +	15.81	1	30.40	1 +
73.56	2	46.19	2	17.12	2	31.28	3
76.15	2	47.88	3	18.44	1	32.58	2
77.87	2	48.63	1	19.39	1	34.48	3
78.55	1	53.77	1 +	21.95	1	35.55	1 +
79.28	5	54.25	1	24.00	2	38.39	10 +
80.18	1	54.48	1 +	24.75	1	41.20	8 +
81.25	1	55.20	2	26.90	1	43.02	5 +
82.02	2	57.10	1	27.27	1	45.70	3
83.66	1	57.50	1	28.20	1 +	50.50	1 +
85.75	2	58.27	2	28.63	1 +	51.82	1 +
88.15	2	60.05	5	31.62	1 +	54.90	1 +
89.42	1 +	60.59	1	34.65	1 +	56.60	1 +
91.30	1 +	62.72	2	35.12	1	59.21	5
92.46	1	64.81	2	41.43	1	60.40	1 +
95.52	2	66.65	1 +	42.41	1	61.31	3
97.66	1	68.23	1	45.53	4	69.10	1 +
99.73	1	69.36	1	46.25	1 +	69.76	2(Fe)
5000.10	3	72.00	1 +	46.87	1 +	71.92	2
07.80	1	72.87	1	47.53	4	76.40	1
09.23	1	74.86	2	48.60	1 +	77.50	1
10.30	1	76.20	1 +	49.84	1 +	79.80	5
11.02	1	76.54	1 +	53.50	1 +	81.00	4
11.85	1	77.22	1	55.42	1 +	83.9	2 +
12.55	1	77.69	1	56.39	1	84.30	1
14.79	3	80.20	4	60.67	1 +	92.25	3
16.30	1 +	81.48	2	63.38	3	93.61	2
16.97	2	84.43	1	67.92	3	95.60	3
17.7	1 +	84.89	1 +	70.9	1 + br	97.10	1
18.96	1	86.57	1 +	71.37	8 +	98.20	1
20.03	1	87.98	1 +	73.11	10 +	5302.50	1
21.43	1	90.81	1	74.30	10 +	04.03	1 +
22.2	1 + br	91.20	2	77.26	1	12.93	1 +
22.6	1 + br	91.58	2	78.99	1 +	13.45	1 +
23.79	1	92.41	2	79.58	1 +	14.07	3
24.39	1 +	93.00	2	80.20	1 +	15.21	2
25.59	1	96.10	2	80.41	1 +	16.00	1 +
26.60	1	96.43	1	81.4	1 + br	17.30	1 +
29.18	3	96.86	3	91.61	2	18.10	1 +

5320.08	1 +	5453.22	2	5552.42	1	5642.60	1 +
24.68	1	56.68	3	56.50	3	50.33	10
26.10	1	58.60	1	56.93	2	51.52	1
27.29	2	60.79	3	58.25	1 +	52.05	1
28.20	2 (Fe)	64.12	1	59.96	1 +	52.42	1
34.95	1 +	64.69	1 +	61.02	1 +	55.67	1
37.40	1 +	65.78	2	62.70	1 +	64.59	2
39.25	1 +	69.40	1	63.60	1 +	67.50	2
49.00	1 +	73.54	8	64.27	2	72.27	1
49.95	1 +	76.03	3	66.87	1	72.65	1
52.52	1	77.90	1	68.82	3	73.83	2
55.02	3	78.39	1	69.67	2	74.69	3
55.7	2 + br	79.28	1	70.69	20 +	78.09	3
56.63	3	80.73	1	75.39	3	83.11	3
60.80	20 +	88.82	1	77.82	1	87.82	1
64.40	10 +	89.58	1	80.39	1	89.34	10
67.18	3 +	90.48	3	83.50	1	89.71	2
71.65	2	92.38	3	83.90	1	90.50	1 +
72.55	2	94.08	3 +	87.93	1	94.59	1
72.93	1	97.20	2 +	89.70	1 +	95.05	1 +
76.13	1 +	98.70	3	91.80	2	95.60	1 +
88.90	2 +	99.70	2 +	95.07	1 +	97.22	1
94.70	3	5501.72	3	96.55	2	98.50	1
97.64	2	02.12	2	5601.29	2	99.49	2
98.94	1	03.80	2 +	02.98	3	5702.30	2
5400.66	3	06.62	50 +	05.63	1	05.91	5
02.90	1 +	10.52	1	07.84	1	07.21	1
06.00	2	11.24	1	08.83	3	08.20	1
06.60	1	11.69	2	09.50	3	10.30	1 +
14.85	1	12.64	1	09.75	1 +	11.99	2
17.52	2	14.00	1	11.13	4	15.31	1
26.20	1	17.59	1	11.51	1	16.20	1
27.09	2	19.45	1	12.55	1	19.45	1
27.80	1	20.20	2	13.27	3	20.31	1
28.97	1	20.83	2	18.24	1	22.98	10
29.90	2 (Fe)	21.38	1	18.62	2	23.30	2
31.20	2	26.69	3	19.01	1	27.22	2
34.75	2 (Fe)	27.13	2	19.54	2	27.83	1 +
35.86	3	29.48	1	21.03	1	28.92	2
37.93	4	31.38	1 +	21.72	1 +	29.70	2
39.90	2	31.83	1 +	22.40	1 +	30.09	2
41.18	1	33.21	30 +	26.97	1 +	31.43	1 +
42.24	1	34.71	1	27.44	1	34.20	2
43.99	1	37.90	1 +	30.82	1	36.60	1 +
47.10	2 (Fe)	39.59	3	32.70	10	37.23	1 +
47.82	1	41.82	2	35.02	3	38.20	1 +
48.76	1	43.30	3	39.60	1 +	39.80	1
49.10	1 +	44.69	3	41.07	1 +	41.85	1
50.72	4	52.00	1	42.00	1 +	42.70	1 +

5743 57	1 +	5849 94	10 +	5943 79	1	6075 78	1
46 97	1 +	51 73	10 +	47 74	1 +	79 79	3
47 80	2	53 42	1	49 35	1	81 50	2
51 63	20	54 48	1	52 2	1 +	83 00	1 +
55 75	1 +	58 45	15	57 84	1	84 80	1
57 66	1	60 70	1	62 85	1 + br	86 80	1
65 44	1	61 53	2	65 10	1 +	87 05	1 +
66 68	1	65 0	1 + br	65 72	2	96 36	1
67 47	1 +	67 60	1	66 04	1 +	6102 03	3
69 90	2	68 30	1	68 65	2	04 36	1
71 20	2	68 91	2	69 20	1	06 32	1 +
74 70	2	69 49	5	69 69	1	07 31	1
76 10	1	69 93	1	70 66	1	10 42	1
78 31	2	71 64	1	71 49	1	10 88	1 +
79 51	3	74 39	2	74 42	2	11 86	1
80 28	2	76 72	3	83 10	2	13 84	1
80 86	1	78 30	1	85 26	1	19 20	2
83 50	2 +	81 19	2	88 30	3	20 76	2
84 17	1	82 91	2	89 61	2	23 71	2
85 83	1	84 49	2	90 20	2	23 92	2
89 23	1	84 85	1	90 85	1 +	25 57	1
92 00	10	88 50	20	91 51	2	28 33	2
94 20	1 + br	90 91	1	96 7	1 + br	30 80	2
95 92	2	91 74	4	99 75	1	31 05	1 +
5800 60	2	92 44	3	6000 95	1	34 75	1
01 60	1	93 56	15	04 08	1 +	35 33	1 +
02 83	3	93 85	2 +	07 9	1 + br	35 52	1 +
04 15	1	96 10	20 (Na)	09 64	1 +	38 76	1
06 38	1	97 99	1	10 22	1 +	39 50	1
06 89	2	98 93	2	10 45	1 +	45 15	1
08 25	1 +	99 80	1	11 50	2	48 52	1 +
08 41	2	5901 61	3	12 35	1 +	49 10	1 +
09 13	1 +	02 15	1	13 19	1	50 32	1 +
09 45	1 +	12 29	1	25 61	3	50 60	1 +
12 69	1	13 13	1	25 90	1 +	53 25	1 +
14 04	1	14 45	1	27 39	3	53 57	1 +
15 69	2	16 39	1 +	30 87	30	54 00	1 +
15 92	2	17 75	1	36 15	1	58 47	1 +
20 89	1	18 80	1 +	36 70	1	58 60	1
25 20	1	19 80	1 +	36 96	1	62 39	2
25 40	2	22 70	1 +	39 90	2	69 25	1 +
25 80	1 +	22 94	1 +	47 99	3	70 85	2
27 09	1	23 91	2 +	51 07	2	75 68	1
35 74	1	26 51	10	54 99	3	81 34	1
40 12	2	29 00	20	58 22	2	89 17	2
41 00	1	31 13	1	64 05	1	91 03	1
41 84	1	32 99	1 +	66 97	1 +	93 40	1 +
43 25	1 +	33 65	1	67 82	1 +	98 82	2
49 02	8 +	38 08	2	74 49	1	99 40	1

6208.47	2	6333.00	1 +	6462.14	2 +	6690.73	2
09.67	1	34.10	1 +	63.72	2	91.34	1
12.65	1	35.22	1	67.20	1	97.0	1 + br
13.43	1	35.93	1	70.20	1	6703.36	1
14.85	1	38.80	1 +	71.40	3	28.40	1
18.08	3	39.30	1 +	74.21	3	34.23	8
22.05	1	40.10	2	76.53	1	46.34	3
24.72	1 +	43.65	1 +	79.39	1 +	46.56	5
28.7	1 + br	57.32	5	86.13	2 + br	54.25	3
30.97	2	58.75	2	92.70	2	63.80	1
32.28	1 +	60.00	1	93.35	3	65.20	1 +
43.05	1 +	65.37	1	95.21	1	65.98	1 +
43.30	2	69.70	1 + br	6512.90	1	73.65	1 +
44.9	1 + br	70.60	1	20.07	3	75.00	1
48.0	1 + br	71.93	1	23.74	1	78.90	1
48.8	1 + br	72.51	2	27.82	1	88.31	1 +
52.80	1 +	82.15	1 +	36.48	2	89.20	1 +
53.75	1	83.95	1	37.80	2	6800.25	1 +
55.88	1	88.90	1 +	43.25	1	02.95	1
56.50	2 +	89.30	3	52.85	1	12.80	1 +
57.05	1 +	90.9	1 + br	53.56	1 +	25.94	1
58.05	1 +	91.30	2	70.02	1	29.30	1 + d
59.68	1 +	93.80	1	71.39	1	39.19	3
64.48	3	6400.20	1 +	72.55	1 +	49.17	1
66.02	3	01.28	4	80.36	1	86.65	2
72.45	1 +	01.48	1	90.64	1	92.73	1
74.81	1	04.60	1 +	91.11	2	98.37	1 +
76.83	1	06.61	2	6603.80	1 +	99.30	1 +
78.63	1	07.13	1	11.49	3	6908.55	1
82.11	2	07.87	1	19.40	10	14.33	3
83.16	1	09.27	4	24.78	2	34.45	1
84.25	1 + br	12.58	3	37.34	1	47.72	1
86.75	2	13.10	2 +	49.69	1	60.00	1 +
90.90	3	14.35	1	50.02	1	61.80	1 + br
93.80	1 +	19.19	1	50.65	8	79.07	1
6301.97	2	19.92	2	58.25	1 +	89.27	1
06.61	1	21.57	1 +	59.95	2	92.03	1 +
11.85	1 + br	24.58	10	72.50	1 +	7001.97	1
17.03	1	29.20	3 d?	78.25	1 +	38.35	1 +
18.6	1 + br	31.05	1 +	79.20	1 +	60.52	1 +
19.2	1 + br	39.9	1 + br	79.97	1 +	7110.28	2 +
23.70	2	46.50	3	88.15	1	7242.9	1 + br
29.68	1	53.46	1				

XL. N. Stickstoff.

Ältere Messungen: Fehlen.

Material: Atmosphärische Luft.

Linienzahl: 0.

XLI. Na. Natrium.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1890).

H. Lehmann, Ann. d. Ph. 5 (1901) (Ultrarot). R. Schillinger, Wiener

Akad. 118 IIa. (1909). J. M. Eder und E. Valenta, Wiener Akad.

119 IIa. (1910) (Rot).

Material: Natriumchlorid auf Gaskohle.

Verunreinigungen: Ba, Ca, K, Li.

Linienzahl: 25.

2680·50	2 + br, u	4499	1 + br	4979·1	2 + br	5683·1	10 + br, r
2853·00	20 u	4666	1 + br	83·5	2 + br	88 6	15 + br, r
3302·56	100 u	70	1 + br	5149·2	1 + br	5890·20	1000 u
03·11	100 u	4748·6	2 + br	53·75	2 + br	96·17	1000 u
45·13	1 +	52·6	2 + br	5670·5	1 + br	6154·48	20
3427·2	1 + br	4975·0	1 + br	75·8	1 + br	61·01	30
3974·1	1 + br Ca?						

XLII. Nb. Niob.

Ältere Messungen: J. M. Eder und E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Niobammonfluorid aus Nioboxid von Prof. W. Muthmann, auf Gaskohle.

Verunreinigungen: Ti.

Linienzahl: 1770.

2376·49	1	2504·75	1	2567·62	1	2590·05	2
87·63	1	11·09	1	69·15	1	92·28	2
98·60	1	21·50	1	70·91	1 +	94·82	1
2412·56	1	25·91	1	71·18	1 +	97·25	1
17 06	1	41·53	1	71·45	1	2601·40	1
18·77	1	44·91	1	72·20	1	01·95	1
33·84	1 +	51·49	1	76·75	1	02·13	1
36·40	1	54·20	1	78·29	1	10·38	1
45·18	1 +	55·73	1	78·85	2	12·50	1
63·00	1	57·04	1	81·32	1	16·55	1
66·82	1	59·05	1	83·25	1	20·55	1
69·18	1	63·55	1	83·33	1	20·68	1 +
77·49	1	65·52	1	84·10	2	23·61	1

2627·55	2	2715·76	1	2793·16	2	2879·47	1
28·60	1	15·96	1	95·98	1	79·57	1
32·63	1	16·16	1	99·02	1	80·84	2
34·80	1	16·37	1	99·48	1	83·32	5
38·05	1 +	16·69	3	2800·43	1	85·06	1
41·01	1	17·37	1	02·19	1	87·18	1 +
41·16	1 +	20·10	1	03·93	1	87·40	1 +
42·34	2	20·31	1	04·35	1 +	88·93	3
46·35	2	21·73	1	08·15	1	90·00	1
47·58	2	22·07	3	09·25	1	90·30	1
49·60	2	22·40	1	10·92	1	90·47	1
51·20	1	24·05	2	11·76	1 +	96·36	1 +
53·03	1 +	26·15	1	16·75	1	96·55	1 +
53·47	2 +	28·13	1	19·34	1	97·13	1
54·51	2	29·90	1	20·94	1	97·46	1
55·76	1	30·40	1	22·05	1 +	97·93	4
56·14	2	33·32	3	25·30	1	99·35	3
57·04	1	33·51	2	26·57	1	2903·78	2
57·67	2	37·15	2	27·19	3	06·53	1 +
61·91	1	40·25	2	29·85	1	08·37	4
65·32	1	41·23	1	35·25	2	09·02	1
66·67	2	45·40	1 +	36·36	2	10·73	5
67·28	1 +	45·81	1	41·05	1	11·88	3
67·37	2	46·98	2	41·29	3	16·60	1 +
67·85	1	48·92	2	42·13	1	17·16	1
68·36	2	53·12	2	42·78	3	23·15	1 +
72·01	2	53·21	1 +	44·54	1	24·48	1 +
73·66	2	54·18	1	45·89	1	25·46	1 +
76·03	2 Au?	54·64	1	46·38	3	27·94	8
78·74	1	55·40	2	48·38	1	31·59	2
79·08	1	55·74	2	49·65	1	32·79	1
80·16	1	57·37	1	51·09	1 +	33·68	1
82·24	1	58·72	3 r	51·55	2	35·39	1
86·50	1	61·12	1	52·07	1	37·44	1
87·24	2	63·49	2	54·27	2	38·19	2
91·85	2	64·66	1	57·40	1	41·67	4
95·14	2	65·37	1	59·10	1	46·00	2 +
96·14	1	66·05	1	60·07	2	46·24	2
97·14	3	66·29	1	61·22	3	47·02	2
98·95	3	68·21	3	64·45	2	51·04	6
2700·25	1	69·72	1	65·73	2	54·15	1
02·28	3	73·30	3	66·78	1	54·65	1 +
02·60	2	79·45	2	68·63	3	54·85	1 +
06·49	1	79·81	2	70·77	1 +	55·59	1
07·91	1 +	80·36	3	74·66	2	57·01	1
14·29	1 +	80·73	1	75·50	4	61·76	1
14·76	1	82·46	2	77·09	5	63·48	1
15·44	1	90·70	1	77·93	1	63·82	1
15·53	1	91·86	2	78·86	1	65·63	2

2968.45	1 +	3043.38	1	3112.21	1	3180.40	3
70.61	1 +	44.87	2	12.50	1 +	81.51	1
72.70	4	45.65	1	12.77	1 +	82.18	1
73.60	1	48.22	3	13.23	1 +	84.31	1
74.22	3	49.65	1 +	15.65	1	87.57	3
74.67	1	51.50	1	16.45	2	89.35	1
77.79	3	51.81	1	19.50	1	89.63	1
79.05	1	52.16	1	21.02	1 +	91.21	4
80.01	1	52.85	1	21.50	1 +	91.55	2
80.85	2	53.20	3 d?	21.80	1 +	94.46	1 +
81.76	2	53.76	1	22.11	1 +	95.08	5
82.21	2	54.28	1	22.77	2	96.25	1
83.26	1	55.65	2	27.64	4	98.32	1
85.16	1	56.73	2	28.50	1	3200.63	2
87.40	2	60.54	1 +	29.02	1	01.61	1
88.80	1	61.29	1	29.48	1	03.46	2
88.88	1	61.38	1	29.78	1 + d	04.45	1 +
90.40	4	62.10	1 +	30.92	8	05.09	1 +
92.06	1	63.27	1	32.22	1 +	06.43	3
92.16	1	63.94	2	32.89	1 +	06.94	1
94.83	4	64.68	3	33.12	2	07.44	1
96.60	1	65.40	2 d?	34.46	1	10.27	2
98.32	1	66.24	1	35.54	1	15.35	1
3000.23	1	69.16	2	36.04	1	15.70	4
02.31	1	69.82	2	37.08	2	16.30	1
05.26	1	71.04	2	40.61	2	17.38	2
05.86	1	71.34	1	44.47	1	17.94	2
10.50	1	71.70	2	45.51	4	18.86	1
10.81	1 +	72.54	2 + d	46.02	1	21.02	2
12.66	1	73.41	2	47.00	1	21.24	2
14.56	1	77.01	3	48.80	1	22.91	2 +
15.37	1	80.51	2	50.53	1	23.03	2 +
19.02	1	81.93	1	51.97	3	23.43	2
19.92	1	83.00	1	52.29	1	24.54	1
22.87	2	84.52	1	52.88	1	25.29	1
24.87	3	85.06	1	54.07	1	25.57	5
28.01	1	88.00	1	54.93	1	29.67	2
28.56	4	94.32	10	55.63	1	30.35	1
28.79	1	96.61	2	59.39	1	36.56	3
29.30	1 Au?	97.25	1 +	59.95	1 +	37.33	1
29.90	1	98.59	1	63.24	1	37.85	1
32.88	3	99.30	3	63.50	5	38.18	1 d
33.49	1	3101.10	1 +	70.29	1	42.66	1 +
35.11	1	02.02	1	71.29	1	43.46	1 +
39.28	1	03.36	1	71.54	1	46.89	2
39.51	1	07.11	1	72.65	2	47.59	1
39.80	2	09.83	1	73.32	2	48.32	1
39.91	2 +	10.95	1	73.78	1 +	49.06	2
41.48	1	11.57	3	75.91	2	49.62	3

3251.42	1	3298.45	1	3357.15	3	3399.84	2
51.67	1	99.10	1	58.03	1	3400.10	1
51.78	2	99.75	3	58.52	10	01.35	1
53.48	1 +	3301.65	1	60.00	1	03.15	2
54.15	3 r	02.32	1	61.05	1	03.86	2
54.98	1	03.46	1	61.37	4 Ti?	05.52	4
57.61	1 +	04.91	1	62.00	1	06.24	3
59.25	1	04.99	1	63.00	1	06.73	1
60.25	3	05.26	1	63.89	1	08.09	1
60.68	3	08.18	3	65.71	2	08.48	3
62.01	2	08.90	1 +	66.04	1	08.80	3
63.48	2	09.95	1	67.11	4	09.29	3
63.93	1	10.23	1	67.51	2	10.02	2
64.71	3	10.58	3	68.55	1	13.03	3
65.45	1	11.50	2	69.75	2	13.62	1
66.16	1	12.74	4	69.99	2	14.16	2
66.55	2	15.33	4	71.46	3	16.09	3
67.17	2	19.09	3	71.56	3 Ti?	17.99	2
67.83	1	19.38	3	72.26	2	20.75	2
69.28	1 +	19.70	3	72.72	1 +	21.30	1 +
69.64	1 +	21.93	1	72.96	3	23.89	3
70.56	3	23.06	3	74.40	2	25.57	4
70.88	3	26.74	4	75.06	3	25.98	3
72.14	5 r	28.05	1	76.47	2	26.69	3
73.20	1 +	29.50	4	76.87	2	27.60	4
73.64	1	29.72	1 +	79.40	1 +	28.49	1
76.07	1	32.02	1	80.20	2	28.90	1
76.65	1 +	32.29	3	80.59	4	29.19	3
77.77	3	32.83	1	81.04	3	31.20	1 +
78.40	1	34.08	1	83.89	3	32.10	2 +
79.36	1	35.53	1	84.80	2	32.55	2
79.96	1 +	36.44	1	85.80	2	32.85	2
80.08	1	39.31	2 d	86.38	2	33.24	3
82.45	1 +	41.71	2	87.13	1	37.00	1
83.09	1	42.08	10 r	87.72	1 +	37.10	1
83.57	3	43.81	6	87.93	2	38.36	1 Zr?
85.78	3	44.08	2	89.08	1	39.46	1
87.71	3	46.88	2 +	90.57	1 +	40.05	2
88.03	3	47.05	2	90.78	2	40.76	3 (Fe)
89.60	1	47.66	1	91.49	2	42.79	2
90.15	2	49.17	6 v	92.13	1 Zr?	42.90	1
91.18	2	49.56	5	92.48	4	44.43	1
92.12	3	50.80	1	94.26	1	45.79	2
94.50	2	52.40	2	94.71	2	48.33	1
96.16	4	52.72	2	95.10	1	50.92	1
96.63	1	53.00	1	96.07	3	52.48	2
97.20	1	53.65	2	96.50	1	52.79	1
97.44	1	54.82	5	98.37	2	54.84	1
97.82	1	55.54	1	99.54	3	55.05	1

3456·65	2	3505·93	1	3556·14	1	3616·33	1
57·10	1 +	06·15	1 +	58·15	1	16·62	1 +
57·92	2	07·12	1	59·25	2	17·81	2
58·90	1 +	08·08	4	59·60	1 +	18·54	2
59·07	2	08·64	1	61·29	1	19·00	2
59·81	2	09·45	1 +	63·71	15 d	19·32	1
60·80	1	10·40	3	66·24	1	19·60	3
61·65	1	11·30	2	68·65	1	19·82	2 +
62·77	2	12·90	1 +	68·89	2	21·15	3
63·16	2	15·54	3	69·60	3	23·99	1
63·90	4 d	16·31	2	72·62	1 Zr?	24·50	1
65·98	3	16·98	2	73·15	1 +	25·29	2
67·59	2	17·24	1	75·27	2	25·84	2
68·67	1	17·80	3	76·00	10	27·99	1
69·27	1	18·30	1	77·85	3	30·76	2
69·56	2	19·47	1	80·42	15	33·12	2
70·40	1 +	19·75	1	80·97	1	33·47	1
71·36	2 +	20·19	3	82·50	2	33·85	2
71·66	1	20·85	2	85·10	4	34·57	2
73·20	3	23·30	1	89·23	5	35·44	1 +
74·15	1	25·08	1 +	89·49	5	35·95	1
75·75	2	25·36	2	90·10	1 +	37·09	2
76·13	1	26·02	1	90·88	1 +	37·66	2
77·33	1	27·23	1	91·06	1	37·98	3
78·13	1	27·40	1 +	91·35	1	38·89	2
78·47	1	28·09	1	91·95	1	39·44	3
78·84	5	30·23	1	94·10	6	40·79	2
79·69	3	30·97	1	97·28	1	43·45	1
80·35	1	33·79	3	97·66	1	43·85	2 +
81·20	2	34·23	2	98·47	1	45·05	2
81·40	1	35·43	10	99·41	2	45·49	1
84·19	2	37·65	10	99·76	3	47·42	1 +
84·75	1	39·76	2	3601·35	1	49·98	4
85·22	1	41·13	3	02·70	6	50·91	3
86·06	2	41·38	1 +	03·60	1	51·31	3
86·86	1	42·06	2	04·15	1 +	53·62	4
88·91	1 +	42·70	2	04·80	1	54·54	1
89·21	2	43·11	2	06·42	1 +	56·09	2
91·19	5	44·15	8	06·64	1	57·24	2
91·62	2	44·79	5	06·94	1	58·04	1
93·62	1	46·18	1 +	07·46	1	58·80	2 +
96·15	1	46·60	1	08·15	1	59·73	3
96·81	1	47·80	1 Zr?	08·46	1	60·51	5
97·92	3	48·25	2	10·89	1	61·81	2
98·75	10	49·38	2	11·43	1	62·18	2
3500·10	1 +	50·39	1	12·80	1	63·35	1 +
00·22	1	50·58	5	13·15	1	64·85	8
03·32	2	51·23	1	13·58	1	65·29	1
05·02	1	54·74	15 d	15·61	3	66·66	2

3667-10	2	3717-16	8	3776-75	1	3884-66	1
67-82	2	17-65	3	77-41	1	85-59	5
68-75	2	18-61	1	77-80	1	85-87	4
69-15	3	19-01	1	81-21	5	86-22	2
69-85	2	20-58	3	81-55	2	86-42	1
71-50	2	21-40	1	84-02	3	86-82	1
71-85	1 Ti?	21-65	2	85-48	2	89-86	1
72-58	2 +	22-45	2	86-35	2	89-95	1
73-37	1	23-10	2	87-26	20	90-48	1 Zr?
74-91	4	25-35	1 +	87-62	1	90-94	1
75-45	1 +	26-40	20	89-65	1	91-51	4
76-44	2	27-36	2	90-30	15	92-49	1
77-21	2	31-69	1	91-43	20	92-93	1
77-91	2	32-19	2	93-04	1	93-00	1
81-82	1	33-76	2	93-96	2	93-49	1
84-09	1 +	38-61	4	94-59	5	93-89	3
84-38	1 +	40-00	20	95-70	2	94-23	5 r
85-31	3	40-99	10	96-73	2	94-85	1
86-70	1	41-45	1	98-29	10	96-05	3 r
88-09	2	41-97	3	99-32	1 +	98-16	1
88-30	2	42-60	20	3801-10	2	98-45	2
88-84	2	44-18	3	03-13	20	98-70	2
89-16	2	47-09	2	04-06	8	99-08	1
91-32	1	48-70	2	04-89	8	99-38	2
93-50	3	50-35	1	06-31	2	3900-67	1
94-80	3	50-78	1	09-25	2	00-98	1
96-02	2	51-45	1	10-64	10	03-13	1 +
96-81	1	51-65	1	11-17	3	04-32	2
97-16	1	51-89	1	12-19	3 +	07-05	2
97-53	2	53-34	3	14-99	1	08-73	1
98-00	10	55-44	1	15-61	3	09-11	3 r
99-70	1	55-91	3	18-97	1	09-75	2
3700-05	2	59-73	10	19-32	6	13-15	2
02-11	1	60-77	1	25-01	4	13-28	1 +
03-30	2	61-26	2	29-57	2 +	13-59	1
04-04	2	63-62	3	31-99	3	14-87	10
04-29	2	64-24	2	35-31	3	17-13	1
07-95	1 +	65-22	3	36-61	4	19-14	2
09-02	1	66-70	3 r	41-93	3	19-29	2
09-57	3	68-89	2 +	46-09	3	19-85	2
10-56	2	69-30	2	53-58	2	20-38	6
11-50	4	70-15	2	54-75	2	20-87	1
11-90	2	71-03	2	59-06	3	21-80	1
12-68	1	71-99	3	63-51	3	22-46	2
13-21	20	73-33	2	68-04	2	23-94	1
13-93	3	74-22	2	75-91	2	24-64	2
14-97	1	74-61	1	77-08	2	25-14	3
16-10	1	74-74	1	77-65	3	25-30	1 +
16-33	2	75-60	2	78-98	3	26-76	2

3929·45	3	3994·56	1	4044·86	2	4094·27	1
31·64	1	97·30	1	46·45	1	94·49	1
33·19	1	97·52	1	48·13	1	95·26	1
33·57	1	98·36	1	48·78	1 +	95·70	1
34·30	1	98·59	1	49·90	2	96·08	1 +
34·56	2	99·31	3	50·15	1	97·03	1 +
35·59	2	99·85	1	51·68	2	97·80	1 +
36·18	1 +	4000·74	2	52·30	1 +	98·37	1
36·60	2	01·26	2	53·35	1 +	99·06	1 +
37·68	10	02·40	1	55·32	1	99·25	4
38·13	2	06·07	1 +	56·00	1 +	4100·05	1 +
41·45	4 r	08·41	2	57·06	1	00·55	4
43·83	5	08·88	1	57·42	1 +	01·14	30
47·64	2	09·05	1	59·14	50	02·89	1 +
47·85	1	09·83	2	59·65	2	04·31	1
49·45	1	12·20	1	59·80	1	06·34	2
49·57	1	12·30	1 +	59·97	1	06·94	1
52·49	2	13·41	2	60·47	2	10·04	2 +
53·16	2	14·08	1	60·97	3	10·49	1 +
53·65	1	15·05	1	61·40	1	12·30	2
55·80	2	16·20	2	61·69	2	13·51	1
57·01	1	17·66	2	62·12	1	14·10	3
59·30	1	20·36	1	64·95	1	14·30	1 +
59·50	2	21·15	1	66·26	1	17·06	4
60·14	1	22·52	1	67·32	2	19·44	2
60·79	1	23·29	2	68·41	3	22·96	2
61·15	1 +	23·43	1	69·32	1	24·01	20
62·31	1	24·40	1 +	70·18	1	25·39	2 +
64·84	1	26·01	1	71·13	2	25·75	1
65·84	4	26·52	1 +	72·25	1	26·33	1 +
66·39	20	26·84	1	73·25	1	27·05	1 +
70·25	1	27·07	1	73·72	1 +	27·61	1 +
70·84	2	27·45	2	73·82	1 +	29·60	8
72·07	3 r	28·10	2	74·52	1	30·12	10
72·68	3 r	29·35	1	76·24	1	31·70	1 +
73·80	2	30·49	1	77·23	1	34·78	3
75·35	1	32·72	20	77·53	1	35·56	1
76·78	2	33·34	8	78·48	1 +	37·30	15
78·09	2	34·67	1	78·72	1 +	37·77	1 +
78·90	2	35·24	1	79·88	30	38·45	1 +
79·52	2	36·05	1	83·95	1	39·22	1 +
80·67	4	37·48	1 +	84·34	1	39·58	3
82·20	1 +	38·31	1	85·02	3	39·89	20
84·95	1	39·22	2	86·77	2	42·43	1
85·22	1	39·69	6	88·21	1	43·37	3
85·30	1	40·60	1	90·31	3	46·13	2 +
88·30	2	42·71	2	90·95	1	47·35	2
90·81	1	43·29	2	91·70	1 +	48·89	2
91·82	2	44·25	2	94·09	1	50·33	5

4152:22	2 +	4216:35	1	4278:34	1	4331:60	10
52:81	20	18:14	20	79:61	2	32:60	1
55:00	1	20:75	1	79:83	2	36:70	1
56:43	1 +	22:83	1	80:79	4	37:70	1
56:90	1 +	24:85	1	81:27	1	37:79	1
58:18	3	26:36	2	81:50	1	38:08	1
60:99	2	27:63	1	82:85	1	38:85	1
61:41	2	27:87	1	85:13	1	38:94	1
62:99	2	28:85	1	86:35	2	39:59	2
63:64	2	29:31	10	87:14	4	42:63	1
63:80	20	29:98	3	88:43	1 +	42:99	3
64:81	15	30:48	3	89:62	4 r	45:48	3
66:00	2	32:11	4	90:37	1	45:67	1
66:18	1 +	37:15	1	91:41	3 r	46:26	2
68:30	20	37:95	2	92:19	3	47:47	2
69:74	5	39:46	1	92:70	4	48:05	1
74:11	3	40:50	1	94:78	1	48:80	3
74:51	2	41:25	1	94:95	1	49:19	3
75:03	1	41:35	1	95:70	2	50:46	2
77:07	1	41:61	2	96:39	3	51:80	10
79:92	2	41:84	1	98:09	1	52:45	1 +
81:50	2	42:80	3	99:81	8	53:43	2
84:60	4	46:44	3	4301:35	15	54:20	1
86:24	2	47:84	1	03:06	1	54:36	1
90:20	2 +	48:80	2	04:02	2	54:97	1
90:83	2	49:11	1	04:80	1 +	55:40	1 +
91:09	20	49:62	3	06:46	2	57:01	2
92:23	10	53:20	5	07:40	1	59:97	2
94:00	2	53:89	4	08:27	2	60:10	2
95:29	8	54:55	1	08:84	2	60:66	1
95:81	2	54:90	3	09:73	3	61:82	2
97:78	2	55:66	5	10:99	1	66:60	1
98:62	3	56:11	1	11:49	8	67:55	1
99:02	1	56:46	1	11:88	2	67:75	1
4201:15	2	58:01	1	12:29	1	68:11	2
01:70	4	59:06	2	12:61	3	68:62	8
03:56	2	60:81	1	13:05	1 +	69:77	2
04:45	2	61:87	2	14:05	2	70:53	2
05:50	20	62:30	8	14:45	1	72:84	1
06:26	2	64:76	1	16:63	2	74:98	2
08:29	4	66:21	8	18:16	2	75:43	2
09:59	1	68:81	3	19:31	1	76:88	1
12:19	2	70:86	5	20:99	1	77:38	1
12:67	2	73:12	1	22:08	1	78:12	10
13:39	2	73:50	1	23:64	2	79:69	2
13:64	1	74:80	2	26:54	20	80:87	1
14:91	15	74:99	1 +	27:58	3	81:31	1
15:64	1	76:57	1	28:60	3	82:69	1
16:05	1	77:62	3	29:91	2	84:05	2

4385.03	2	4446.00	2	4511.28	3	4589.18	1
86.46	1	46.37	3	12.32	1	92.63	1
87.91	2	47.40	10	13.63	1 +	99.63	1 +
88.53	3	48.22	1	17.07	1 +	4600.39	4
89.66	1	50.08	1	19.19	1	03.04	2
91.40	1	51.09	2 Ti?	21.04	1	03.97	2
91.79	1	53.50	2 Ti?	22.42	1 +	05.82	1
92.90	3 d?	53.86	1 Ti?	22.75	1	06.96	10
94.10	1	54.00	2 + d (Ca)	23.61	8	08.71	2
94.41	1	56.50	1 +	23.90	2	10.28	1
95.22	1 Ti?	56.97	3	24.30	2	10.85	2
97.20	2	58.26	3	27.81	1	12.23	2
99.97	1	59.83	1	29.56	1	12.59	1
4400.55	2	60.35	2	30.57	1	14.88	2
01.01	2	60.61	3	31.63	1	16.30	8
01.35	1	64.31	3	42.03	1 +	18.55	1
02.23	2	65.39	1	42.40	1 +	19.55	1
04.09	1	66.08	1	42.95	2	20.19	1
06.70	2	66.34	1	43.83	1 +	21.85	1
10.40	10	66.59	1	47.00	10	22.50	2
11.05	1	68.08	1 +	48.00	1	24.74	2
11.69	3	68.66	1	50.85	1	25.51	1
12.33	1	69.49	2	51.20	1 +	26.13	1
13.16	1	69.89	4	51.70	1	27.61	2
15.01	1	71.49	5	52.10	1	28.81	1
16.52	2	72.72	4	54.01	3	30.30	10
17.01	1	75.44	1	57.02	2	32.15	1
17.41	1	76.11	1	59.60	1	32.41	1
17.86	1	76.65	1	62.53	1	33.10	1 +
19.61	5	77.73	1	63.95	1	33.95	1 +
20.00	2	78.25	1	64.38	1	36.89	1
20.61	2	79.82	1 +	64.73	8	38.26	3
20.80	8	80.54	1	67.30	1	39.79	1
21.45	1	81.61	1	67.53	1 +	40.40	2
21.88	1 +	83.05	1	69.33	1 +	43.48	3
24.03	2	84.97	1 +	69.70	1 +	43.87	2
26.83	3	89.47	1	71.15	1	44.00	2 +
28.75	1	90.53	1	72.15	1	45.55	1
29.61	3	91.24	1	73.30	20	47.09	3
33.07	1 +	93.15	1	74.52	1	47.67	1
33.68	1 +	94.72	2	75.02	3	49.10	6
36.05	1	97.45	1	75.54	2	49.42	3
36.85	1	98.33	1 d	79.61	1	49.79	1
37.41	20	4500.00	3	81.85	10	50.13	1
38.05	1	00.68	1	82.46	3	50.88	1
39.51	1 +	01.47	1	83.06	1	51.38	1
41.98	2 +	03.23	4	83.31	1	52.29	1
43.95	1	03.60	2	83.70	1 +	53.00	1
44.41	1	08.60	3	85.02	1 +	53.55	1 +

4655·00	1	4708·40	10	4773·00	2	4842·31	3
56·11	1	12·05	2	73·44	4	45·33	3
58·30	2	13·20	3	76·30	2 +	45·65	1
60·35	1	13·63	5	77·81	2	47·60	1
61·11	2	15·98	3	79·95	1	48·45	4
63·99	10	18·22	3	80·28	1	48·59	3
64·53	1	20·25	1	81·18	1 +	49·52	1
65·48	2	23·29	1	81·75	1 + d	52·06	2
66·38	3	23·96	3	83·12	2	52·48	2
66·79	1 +	26·90	1	84·50	2	54·10	1
67·37	3	27·46	3	85·87	3	57·50	1 +
68·38	2	30·49	3	87·81	2 + d?	58·03	1 +
69·40	1 +	33·61	3	90·15	3	58·67	1 +
70·00	2	34·03	5	90·73	2	61·16	1
70·25	1	35·50	3	91·10	2	62·10	1 +
71·02	1 +	36·60	2 +	93·25	2 +	63·70	1 +
72·25	20	40·78	3	94·85	1 + br	65·40	1 +
73·74	2	42·25	1	96·75	1 +	66·16	1 +
74·51	1	42·60	2	98·45	1 +	67·00	4
75·53	20	44·00	3	99·00	1	67·90	1 +
78·60	4	44·79	3	4802·61	3	68·47	1 +
80·15	1	45·20	2	04·10	1 + br	69·16	5
80·63	1	47·15	3	05·30	1	70·30	1
81·03	2	48·20	2 +	05·76	1	70·51	1 +
81·72	2 +	49·02	2	06·79	1	70·98	1 +
82·79	2	49·78	3	07·21	3	72·69	2
83·15	2	49·97	3	09·20	2	73·38	1 +
83·81	1	50·95	1	09·50	3	74·33	1 +
85·28	4	51·61	3	10·75	10 d?	76·00	1 +
85·68	2	52·30	1	11·48	3	78·20	1
86·05	2	53·02	1	12·28	1 +	78·69	2
87·31	1 +	53·68	1	13·68	1 +	79·38	2 +
87·90	1	55·10	2	15·18	2	80·88	3
88·61	1	55·54	3	16·51	10	81·85	1
88·97	1	56·75	2	20·21	1 +	83·30	1 +
89·30	1 +	59·40	2 d? (Ti)	21·27	1	85·91	2
92·28	1	60·80	1 +	22·10	1 +	86·49	1
94·63	3	62·26	1 +	22·45	1 +	89·69	2
95·59	3	63·75	1 +	24·30	1 +	90·00	1
96·05	1	64·00	1 +	25·12	3	90·93	5
96·77	1	65·23	1 +	27·12	1	92·68	3
97·60	3	66·70	2	29·43	4	95·75	3
97·90	2	67·00	3	30·84	1 +	97·69	2
4702·15	2	67·31	1	32·35	1 +	98·64	2
04·05	2	68·40	1 +	33·52	5	4900·96	3
04·77	1	69·83	1 +	35·75	1 +	02·00	1
05·20	2	71·39	1	37·80	3	03·20	1
06·28	10 d	72·03	3	38·20	3	04·71	3
07·26	1	72·43	1	40·50	1 +	08·50	1

89	2	4994.48	3	5061.20	1	5145.79	1 +
31	1	96.28	1 +	64.59	2	46.20	1 +
20	1 +	96.76	1	65.42	3	47.70	3
10	5	97.26	1	66.18	1	48.15	1
84	1	98.03	3	68.40	2 +	49.37	1
01	2	5000.85	2	69.10	1	49.80	1
53	3	01.12	3	70.85	1 +	50.80	3
93	1	02.41	3	71.80	3	51.10	1 +
93	1	08.20	2	72.70	2	52.34	1
02	3	11.90	2	76.14	3	52.79	3
13	3	13.42	3	77.59	3	53.20	2
73	2	17.49	2	79.12	8	53.79	2
30	1	17.91	5	79.51	1	57.31	1
36	2	18.73	1	82.50	1	57.68	2
35	2	19.67	3	84.23	1 +	58.21	2
51	2	20.53	1	85.09	3	60.51	8
16	2	20.94	1	86.06	1	61.81	1
10	2 +	26.53	4	87.00	2	64.53	10
55	3 +	27.98	1	88.56	1 +	66.44	1
73	1	28.80	2	89.01	3	67.15	1
30	3	29.81	2	94.59	3	67.57	2
77	2	30.29	3	95.48	15	74.38	2
55	3 + d?	31.20	1 +	96.74	1	74.75	1
10	1	32.03	3	97.91	2	78.38	2
0	2	33.50	1	99.03	2	80.49	5
8	2	34.50	1	5100.33	5	82.97	1
2	4	34.89	1	01.02	1	83.48	2
8	5	35.68	1	01.69	1 +	84.00	2
5	1	36.13	3	02.16	1	87.13	4
4	1 +	37.54	1	02.54	3	88.20	1 +
0	3	38.07	2	05.06	1 +	89.33	4
0	4	39.22	8	05.70	2	89.96	1
9	3	41.57	1	08.80	1	90.40	1
3	2	41.95	1	11.10	3	92.00	1
0	1 +	42.75	1 +	13.61	1	93.20	5
0	1 +	43.20	2	16.89	3	93.63	2
1	1 +	43.65	2 +	18.22	2	94.76	1
0	1 +	44.16	2	20.48	5	96.00	4
3	1	46.92	2	21.96	4	97.50	2
5	1 +	48.13	3	24.84	3	98.79	1
0	1 +	49.71	1	25.45	2 +	5201.21	2
4	1	50.08	1	27.81	3	01.70	1 +
8	1 +	51.80	2	28.44	2	02.10	2
5	1 +	53.12	1 +	29.89	2	02.50	1
5	1 +	54.39	2	33.48	3	02.80	1 +
2	5	54.84	3	34.90	5	03.34	3
2	2	55.81	3	35.62	2	04.17	2
1	2	58.19	5	37.52	3	04.66	2
	1	59.52	3	40.78	4	05.36	3

5205.65	1	5298.28	2	5376.10	1 +	5483.70	2
06.18	2	99.11	2	76.91	1 +	91.28	1
06.52	1 +	5301.60	2 +	77.99	2 +	94.35	1 +
07.80	2	03.42	2 +	80.87	2	99.76	2
08.60	3 Cr?	05.29	1	81.52	3	5501.99	1
10.53	3 Ti?	06.54	2	83.03	1	04.81	4
11.40	3 +	06.78	1	84.20	1 +	09.35	2
18.61	1 +	07.16	1	88.49	2	10.93	1 +
19.25	5 d	08.08	1 +	94.57	2	11.55	1 +
25.30	3	14.47	2 +	95.67	1	13.05	3 +
29.51	2	15.71	3	96.05	2	14.75	1 +
30.09	2	17.19	2	96.52	3	17.61	1
31.50	1 +	17.99	2 +	5400.75	1 +	18.40	1 +
31.96	1 +	18.79	5	02.70	1	18.65	1 +
32.99	4	19.65	3	03.26	1	22.14	1
34.60	1 +	20.38	2	04.65	1 +	23.80	3
35.25	3	21.50	2	09.63	1	26.50	1 +
36.47	1 +	21.83	1	10.00	1	32.82	2
36.99	2	22.15	1 +	11.45	2	39.00	1
37.57	5	23.51	2	16.50	2	41.70	2
40.52	3	26.51	2	22.63	3	45.75	1 +
41.65	3	28.20	1 +	28.05	1 +	49.88	1 +
44.00	1 +	34.46	1 +	31.48	3	50.40	1
47.50	4	35.03	4	32.70	1	51.60	3
51.25	1 +	36.99	3	34.70	1 +	52.55	1
51.81	8 d?	38.05	2	37.50	5	53.34	1
53.18	3	40.15	1 +	43.30	2	63.20	3
54.09	3	40.98	3	44.02	1 +	66.35	1
55.66	2	43.79	2	45.90	1 +	71.63	3 +
60.29	3	44.38	20	48.53	2	72.75	1
60.99	2	46.75	1 +	53.02	1 +	76.35	3
64.34	1	48.50	1	53.25	1 +	78.32	1
65.8	1 + br	49.00	1	56.36	2	78.50	2
67.90	1 +	50.96	10	57.85	1	87.19	3
70.06	2	51.27	2	58.26	3	91.22	2 +
71.70	8	53.49	3	61.12	2	95.10	1
72.60	3	55.30	1 +	62.50	1 +	97.10	1 +
76.30	10 d	55.51	2	67.05	1 +	99.81	2
77.58	2	55.89	2	67.59	1 +	5603.72	3
78.70	2	59.40	3	68.26	2	04.19	2
79.57	3	61.80	1	69.74	2	06.60	1
81.75	1	62.21	2	72.10	1 + br	18.89	1
85.43	8	63.29	2	73.49	1	20.0	1 + br
87.23	1	63.50	1 +	76.28	2	28.45	2
88.70	1 +	68.60	2	77.53	1	29.38	3
93.47	2 +	69.50	1 +	78.97	1	30.05	1 +
94.65	1	71.27	2	79.44	1	35.65	2 +
95.85	1 +	72.53	1 +	81.21	2	42.31	3
96.50	3	75.42	3	83.30	1	45.51	2

5648·63	1 +	5765·21	3	5874·97	3	6148·31	2 +
54·28	1	71·29	2	75·52	1	64·52	2
62·25	1 +	75·07	1 +	78·02	2	74·61	1
64·89	4	76·20	2	79·24	1	6204·99	2 +
65·80	4	76·40	2	86·23	1	13·29	1
67·03	2	80·05	1	93·71	2	22·12	2
71·27	5 d	80·56	1	5900·85	10 d	52·00	2
72·09	3	87·75	4	04·10	2 + d	61·00	2
76·12	1	90·00	1	04·78	1	69·00	1 +
77·62	2	90·90	1	16·35	1	86·65	2 +
84·67	1 +	94·48	3	27·68	2	6312·40	2
93·28	2	5801·25	1 +	28·42	1 +	19·39	1
98·18	2	02·05	1 +	28·60	1 +	26·02	1
5706·40	2	04·27	3	34·42	2 + d	46·49	1
06·70	3	10·95	1 + br	42·54	1	49·20	2
08·70	1	12·18	1 +	50·20	1	76·20	1
09·59	3	15·59	2 +	57·98	2	6430·71	10
12·29	1 +	19·70	3	83·50	3	33·49	4
13·68	1	20·89	2	86·39	2	50·10	1
14·05	1 +	35·14	3	86·89	1	98·09	1
15·82	1	38·40	2	98·03	2 +	6544·92	4
16·59	3	38·90	4	98·25	2 +	6614·43	1
22·97	1 +	42·75	3	6028·99	2 +	60·99	3
25·90	2	46·35	2 + d	29·99	2	61·21	3
29·39	4	50·97	1	32·09	2	77·59	5 d?
37·57	1	53·10	1	45·75	2	6701·49	2
38·41	1	56·00	1	49·00	1	23·90	3
43·56	1 +	57·00	1	56·90	2	40·19	2
44·08	1 +	62·42	1 +	6103·75	1 +	6828·40	2
51·65	3	63·51	1 +	07·94	2	76·75	1 +
53·51	1 +	64·40	1 +	11·20	1	6908·40	1 +
54·73	1 +	64·75	1	14·10	1 +	18·70	1 +
58·38	1 +	65·23	1 +	42·70	1	90·67	1 +
59·25	1 +	66·75	4	44·12	1 +	7047·2	1 + br
60·58	4	69·20	2				

Kanten.

Von 5800 ab im Hintergrund Banden ohne angebbare Kanten.

6474·20	K.R.	6495·20	K.R.	6576·3	K.R.	6591·4	K.R.
84·60	K.R.						

XLIII. Nd. Neodym.

Ältere Messungen: M. Bertram, Diss. Bonn (1905). J. M. Eder und

E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Neodymnitrat von Dr. C. Auer von Welsbach, auf Gaskohle.

Verunreinigungen: Sa, Pr, Eu.

Linienzahl: 2762.

2962·97	1 +	3201·90	1	3274·14	1	3339·55	1
63·67	1	03·59	1	75·34	2	42·05	1
93·30	1	04·22	1	75·81	1	43·47	1
3008·07	1	05·10	1	75·97	1	45·20	1
14·26	1	05·72	1	76·24	1	45·63	1
18·44	1	11·10	1	80·34	1	45·81	1
52·25	1	13·59	1	80·61	1	46·71	1
56·79	1	17·23	2	81·65	1	46·96	1
69·87	1	17·45	1	82·95	1	47·68	2
71·60	1 +	22·66	1	85·24	2	48·01	2
75·51	1	22·94	1	86·74	1	48·25	2
79·52	1	23·19	1	87·96	1	49·06	1
80·28	1	23·69	1	89·66	1	50·66	1
81·10	1	23·90	1	90·19	1	51·33	1
92·99	2	24·40	1	90·80	1	51·98	1
98·55	1	28·15	1	92·46	1	52·35	1
99·62	1	29·30	1	93·17	1	53·52	1
3105·52	1	31·47	1	93·96	1	53·72	2
05·61	1	31·83	1	94·81	1	54·75	1
06·27	1	34·10	1	98·74	1	55·79	1
08·10	1	34·75	1	3300·28	2	56·03	2
15·30	2	34·93	1	01·05	1	56·66	1
16·25	1	38·05	1	04·76	1	58·29	1
19·85	1	38·40	1	05·25	1	59·89	2
23·19	1	39·88	1	05·41	1	61·68	1
24·18	1	45·66	1	07·91	1	61·90	1
24·66	2	46·50	1	08·10	1	64·49	1
27·20	1	47·41	1	10·49	2	65·05	2
33·74	2	51·01	1 +	11·05	2	66·96	1
35·00	2	51·94	1	12·89	2	69·19	1
37·35	1	53·43	1	13·26	2	69·70	1
41·63	1	54·20	2	16·12	2	73·44	1
42·55	1	55·18	1	18·54	1	75·05	1
44·68	1	56·26	1	19·15	1	75·26	1
44·96	1	56·93	1	20·52	1	75·76	1
48·63	1	57·04	1	25·28	1	76·59	1
49·41	1	59·37	2	26·02	2	78·00	1
49·65	1	59·58	1	26·36	1 +	79·90	1
55·87	1	60·79	2	27·28	1	82·23	1
59·30	1	63·56	1	27·69	1	82·95	1
62·75	1	64·53	1	27·80	1	84·81	1
76·09	1	65·25	2	28·16	1	86·40	1
79·03	1	65·51	1	28·40	3	86·61	2
81·65	1	67·38	2	30·20	1 +	87·30	1 +
88·84	1	67·82	1	31·70	2	88·12	2
91·63	1	71·60	1	32·32	1	89·42	1
93·19	1	71·73	1	33·17	1 +	92·42	1
3200·00	1	72·30	1	34·59	2	93·76	2
00·75	1	73·30	2	39·17	2	95·46	1

64	1	3485.05	1	3555.89	2	3609.60	1
45	1	85.14	1	56.45	1	09.92	3
53	1	86.96	1	58.70	1	10.90	1
47	1	87.10	1	59.25	1	11.05	1
29	1	87.99	1	59.85	1	12.79	1
58	1	95.62	1 +	60.87	3	14.09	1
53	1	96.15	1	61.75	1	14.80	1
10	1 +	97.32	1	63.52	1	15.93	3
35	2	99.22	1 +	68.45	1	16.46	1 +
15	1	99.70	1	69.04	3	16.88	1 +
52	1 +	3500.10	1	72.51	1	17.18	1
41	1	01.70	1 +	72.93	1	17.84	1
66	1	01.93	1 +	73.36	1	18.09	1
21	1	02.16	1 +	74.50	1	18.90	1
40	1	04.18	1	76.29	1	19.09	3
35	2	05.42	1	77.55	1	20.34	1
05	2	10.83	2	80.30	1	20.89	1
11	1	12.86	1	80.60	1	23.35	1
56	1	15.19	1	80.70	1	23.73	1
75	1	19.00	1	82.75	1	24.78	2
38	1	19.90	1	83.01	1	26.33	1
70	1	20.08	1	83.53	1	27.02	1
73	1	22.17	2	86.97	1	27.55	1
30	1	23.09	1 +	87.64	3	27.87	1
21	1	23.75	1	88.37	2	28.71	1
33	1	27.65	2	91.78	1	29.75	1
45	1	28.35	1	92.20	1	30.08	2
74	1	29.36	1 +	92.71	3	31.16	2
76	1 +	31.95	1 +	93.28	1	33.62	2
52	1	32.90	1	93.71	1	34.41	3
68	1	33.74	2	94.33	1 +	34.98	2
14	1	34.68	1 +	95.25	1	35.23	1
13	1	36.20	1 +	95.55	2	37.10	2
93	1	36.58	1 +	96.05	1	37.36	2
07	1	36.80	1 +	98.14	3	37.90	2
71	1	37.60	1 +	99.22	1	38.19	1
99	1	38.96	1	99.54	1 +	38.85	1 +
06	1	39.30	1	3600.26	1	39.30	1
30	1	39.48	1	01.06	2	40.35	2
54	2	41.72	2	01.46	1	40.70	1
1.00	2	43.46	3	01.70	1	41.22	1
5.23	1	44.22	1 + br	01.97	1	41.61	2
3.52	1	45.05	1 +	06.45	1	42.58	1 +
1.56	1	49.00	1 +	06.52	1	42.74	1
2.33	1	49.45	1 +	06.87	1	43.72	2
2.65	1	53.00	1	07.26	1	44.21	1
3.00	1	53.40	1	07.64	1	44.77	1
3.16	1	53.70	1	07.86	1	45.29	1
4.49	1	54.15	1	08.06	1	45.72	1 +

3645·88	2	3711·40	1 +	3756·46	1 +	3802·44	2
48·27	2	11·55	1 +	57·00	1	03·25	1 d
49·61	2	12·52	1	57·95	2	03·63	3
50·02	1	12·89	1	59·08	4	04·25	1
50·54	2	12·96	1	59·92	2	05·00	1 +
50·80	1	13·84	2	61·73	1	05·50	5
51·70	2	14·32	2	62·25	1	05·69	3
52·60	1	14·92	3	63·61	4	06·37	1
52·71	1 +	15·19	2	65·51	1	06·58	1 +
53·22	3	15·51	1	66·08	1	07·36	3
54·23	1	15·80	3	66·73	2	08·40	2
55·17	1	16·67	1	68·86	1	08·90	3
60·10	1	18·69	2	69·48	1	09·20	3
61·14	1	19·36	1	69·80	3	09·89	1
62·39	2	20·70	2	71·25	1 +	10·63	3
63·20	1	21·47	2	71·45	1 +	11·23	2
64·11	1	21·89	1	72·20	2	11·93	2
65·33	3	22·56	2	72·54	1	13·70	1
65·90	1	23·65	4	73·10	1 +	14·90	5
68·94	1	25·01	3	73·35	1 +	16·50	1
69·57	1 +	26·49	1	74·23	1	17·47	1
71·08	1	27·04	2	75·02	1	18·95	1
71·59	1	28·26	4	75·64	6	19·84	2
71·83	1	29·27	1 +	76·59	1	20·96	1
72·48	3	30·73	2	77·15	1	21·92	1 +
73·65	3	31·40	2 d	79·60	3	22·10	1 +
74·79	1 +	31·76	1	80·55	3	22·61	2
78·34	1	32·16	1	81·48	3	23·39	1
79·00	1 +	32·90	2	83·94	2	23·94	1
79·40	1 +	35·69	5	84·41	6	26·55	3
85·06	1	37·25	3	84·90	2 d	26·97	2 +
85·91	4	37·86	1	85·24	1	27·68	1 +
86·19	1 +	38·19	4	85·53	1	28·96	2
87·42	2	39·78	1	87·30	1	29·26	2
88·49	1	41·10	1	89·10	1	30·60	2
89·86	2	41·56	3	90·95	1	31·55	1
92·60	1 +	42·72	1	91·65	2	32·90	1
93·29	1	44·35	1 +	92·70	1 +	33·16	1
94·93	1	49·15	2 +	92·96	1	35·50	1
97·31	1	50·00	2 +	95·60	2	36·68	3
97·63	2	50·45	2 +	95·96	1	37·05	1
99·60	1 +	50·86	1	96·29	1 d	38·06	2
99·90	1 +	52·35	1	96·63	1	39·12	4
3700·60	1	52·62	3	98·06	1	39·63	2
01·08	1	52·80	3	99·40	1	42·05	3 +
02·98	1	53·47	1	3800·20	1 +	44·35	2
03·30	1	54·05	1	00·79	1	45·85	1
04·00	1	54·95	2	01·27	2	46·11	1
05·09	1	55·72	2	01·50	1	46·86	2

3847.09	1	3906.04	4	3956.09	2	3998.10	2
47.58	1	06.21	2 +	57.59	2	98.34	1
48.37	5	07.64	1 Sc?	58.14	4	98.85	2
48.63	5	07.98	4	59.25	1	99.54	1
50.38	2	09.39	1	60.39	1	4000.25	1
51.88	8	11.31	8	62.35	4	00.68	4
52.55	2	12.04	1 Sc?	63.29	6	01.45	1
53.65	1	12.37	3	64.04	3	02.48	1 +
54.76	2 d	13.82	2	64.33	1	03.32	1
58.70	3	15.26	2	67.20	2	04.15	4
59.85	1	16.06	2	67.89	2	04.40	2
61.10	2	17.76	2	69.01	3	04.99	1
62.70	3	18.15	1	69.83	2	06.50	1
63.52	10 r	19.05	1	71.84	1	07.58	3
64.27	1	20.02	3	72.35	1	08.38	1
64.70	1 +	21.10	5	72.55	1	08.90	2 Pr?
66.13	2	24.61	2	73.44	6	10.60	2
66.63	2	25.11	1	73.83	6	11.24	2
66.95	2	25.77	1	75.35	2	12.42	8
69.19	3	26.76	1	76.29	2	12.89	3
74.92	1	27.24	4	76.99	5	13.40	2 +
75.48	1	29.39	2	77.45	1	15.71	1
75.98	6	29.63	1 +	78.13	1	18.96	3
78.71	3	30.08	1	78.45	1	19.94	2
79.33	1	30.62	1	79.20	1	20.20	2
79.70	4	33.03	1	79.63	5	20.71	1
80.51	3	34.24	2	80.48	1	21.02	4
80.90	3	34.96	4	81.16	1	21.49	4
81.74	1	36.25	3	81.38	2	21.93	6
83.90	1	36.82	1	82.50	4	22.44	1
84.25	1	37.14	1	83.12	1	23.18	5
84.85	1	37.71	1	83.55	2	23.96	1
88.00	3	39.00	4	83.72	2	24.93	3
89.80	2	39.66	2	86.39	4	26.80	1
90.09	3	41.69	6	87.38	1	28.91	1
90.39	2	42.26	1	87.95	1	29.40	1
90.73	4	42.76	2	88.96	1	30.05	1
91.12	4	46.91	1	90.30	8	30.62	4
91.69	3	47.71	1 +	91.91	5	31.72	1 +
92.20	3	48.46	2	92.33	1	31.97	8
94.80	4	50.55	1	92.41	1	33.66	1
95.52	1	50.89	1	92.74	2	34.06	1
96.29	2	51.32	10 r	93.15	1	34.25	1
97.78	2	52.35	4	93.69	1	36.16	1
3900.40	5	53.00	3	94.23	1 +	36.67	1
02.01	5	53.62	5	94.35	1 +	37.52	1
02.58	1	54.54	1	94.86	8	37.78	1
03.67	1	55.21	1	95.40	2	38.27	2
05.32	1	55.71	1	97.58	1	39.69	1 + br

4040.54	1 +	4090.40	1	4136.39	1 +	4193.75
40.98	5	91.14	1	36.90	2	94.01
41.21	2	93.25	1	42.51	1	94.55
42.64	1	94.75	2	44.71	3	94.87
43.20	1	95.55	1	46.28	2	95.18
43.75	2	95.92	1	49.17	1 +	98.34
44.50	1	96.28	3	50.95	1	98.97
47.75	1	96.85	2	51.85	3	99.28
48.95	3	98.31	3	53.90	2 +	4200.20
49.64	1	99.06	2	55.96	1	03.60
51.30	5	99.31	1	56.30	10	04.50
53.40	1 +	4100.38	3	56.88	1	05.41
53.97	1 +	00.89	1 Pr?	57.73	1	05.78
54.54	1	01.61	1	59.72	2	07.00
55.01	2 Pr?	01.85	1	60.71	3	08.07
55.79	1	02.70	2	61.49	1 +	08.55
56.98	2 +	04.35	2	61.59	1 +	09.25
59.50	1	04.69	2	63.49	1	09.98
60.11	4	05.71	1	64.59	1	11.00
60.71	1	06.12	1	65.00	1	11.47
61.27	10	06.72	3	65.21	2	12.92
61.85	1	07.60	2 +	66.74	1	13.23
62.36	1	08.10	2	67.68	1	13.33
66.70	1	09.21	5	68.16	2	14.40
67.85	1	09.60	8	68.92	1	14.73
69.00	2	10.61	4	70.65	2	15.50
69.40	4	11.54	1	70.92	2	17.20
71.62	1	12.70	1	73.54	2	17.40
74.55	2	13.98	3	74.33	1	18.70
74.90	1	15.30	1	74.66	1	19.70
75.25	5	16.48	1	75.75	4	20.40
75.43	4	16.92	4	77.50	8	21.30
77.30	1	19.47	1	78.61	2	21.80
77.75	3	20.81	2	78.76	3	22.20
78.41	1	22.10	2	79.72	3	23.30
80.37	3	23.12	1 d	81.03	1 +	25.00
82.58	2 +	24.04	4	82.45	1	25.70
83.39	1	25.21	1	82.67	2	27.10
83.70	1	25.68	1	83.30	1	27.80
84.03	1	28.29	1	83.84	1	28.10
84.40	1	28.85	1	84.30	1	28.30
84.68	1	29.22	1	85.14	2	28.60
85.30	1	30.02	1	85.90	1	28.90
85.94	3	30.91	1	86.18	2	29.60
86.95	1	32.72	2	88.40	2 +	31.30
87.59	1	33.52	5	88.96	1	32.50
88.67	2	34.89	1	90.30	1	33.30
89.23	1	35.48	8	90.61	1	34.30
89.78	2	35.98	1 +	92.64	1 +	35.40

4237.45	1	4374.55	1	4299.84	2	4324.30	1
37.93	1	74.92	1 +	4300.06	1	25.05	1 +
40.01	4	75.25	5	01.04	2	25.36	1
40.39	1	75.64	1	01.40	2	25.87	15
41.37	2	75.90	2	01.60	1	26.50	1
43.27	1	76.45	1	02.03	1	27.07	1
43.36	1	77.42	3	03.44	1	27.25	1
44.47	1	78.16	1	03.78	20	28.06	5
44.72	1	78.26	1	04.63	4	28.30	2
45.14	1	78.62	1	05.60	2	28.85	1
45.83	1	78.91	1	06.44	1	29.55	1
47.05	2 Sc?	79.47	1 +	06.91	2	29.78	1
47.54	10	79.61	1	07.35	1	30.24	1
48.30	1	79.83	1	07.75	1 +	30.43	1
49.49	1	80.33	2	07.88	3	30.59	1
50.53	2	80.55	2	09.10	1 +	30.81	1
51.55	1	80.90	1	09.70	2	31.03	1
52.18	1	81.12	2	09.94	1	31.23	1
52.60	4	81.53	1	10.25	1	31.53	1 +
53.02	2 +	81.99	1 +	10.65	2	31.75	1
53.25	1 +	82.67	10	11.40	2	31.95	1
54.03	2	83.20	1	12.25	1	32.40	1 +
54.45	2	83.55	1	13.52	2	32.65	1
56.01	2	84.15	1	13.74	1	32.72	1
56.39	2	84.66	5	14.54	3	33.35	1 +
56.60	2	85.00	1 +	14.67	4	33.55	1
56.96	2	85.40	1	14.87	1	34.1	1 + br
57.44	1	86.10	1	15.45	1	34.70	1
57.93	2	87.53	2	16.24	1	34.94	1 +
58.25	1	88.15	1 +	16.63	1	35.34	1
59.10	1	88.45	1 +	17.33	2 +	35.52	1
59.76	2	89.45	1	17.87	1	35.80	1 +
62.00	3	89.55	1	18.16	1 +	36.1	1 + br
62.42	2	90.54	2	18.55	1	37.00	1
63.59	2	91.09	3	18.78	1	38.23	1 +
64.10	3	91.35	1	19.48	1	38.85	5
65.34	1	91.85	1	19.71	1	39.07	2
66.02	1	92.05	1	20.11	1	40.10	1
66.58	1	93.05	1	20.47	1	40.43	1
66.86	3	93.36	1	20.92	1	40.86	1
67.55	1	94.67	1	21.35	1	41.50	1 +
68.40	1	94.88	1	21.57	1	41.95	1
68.90	1	95.38	2	21.97	2	42.23	3
70.07	1	96.00	1 +	22.24	1	43.65	2
70.72	3	96.50	1	22.69	1	43.90	2
72.95	4	96.92	1	23.04	1	44.15	1
73.89	2	97.51	2	23.41	1	44.50	1
74.15	1	97.93	3	23.69	1	45.08	1
74.25	1	98.63	2 +	24.05	2	45.65	1

4345.75	1	4367.60	1 +	4393.53	1	4419.70	1 +
46.23	1	68.78	5	94.36	2	20.30	1 + d
46.64	1 +	69.59	1	94.83	1	20.69	2
47.04	1	70.26	2	95.13	1	20.95	1
47.35	1	70.45	2	95.66	2	22.03	1 +
48.50	1	70.90	1	96.06	2	22.15	1 +
48.69	2	71.20	2	96.2	1 + br	23.20	1 +
49.22	2	71.53	1	97.05	1 +	23.40	1 +
49.81	1	71.75	1	97.45	1 + d	24.78	1 +
50.38	2	72.30	2	97.84	2	26.26	2
50.60	1	72.44	2	98.20	2	26.63	1
51.41	8	72.88	2	98.39	1	26.99	2
52.03	1	73.30	1	98.85	1	28.03	1
52.26	1	73.80	1	99.18	1	28.30	1
52.65	1	74.24	1 +	99.75	2	29.13	1 +
53.16	1	75.11	10	4400.25	1	29.45	1 +
53.42	1	75.59	1	00.96	10	30.35	1
53.77	1	75.85	1	01.20	1	30.58	1
54.16	1	76.57	2	02.65	1	30.75	1
54.45	1 +	77.24	2	03.13	1	31.07	1 +
55.05	1	77.52	2	03.30	1	31.19	1 +
55.51	2	78.20	1	03.50	1	31.88	1
55.63	1	78.95	1	03.70	1	32.03	1
56.14	4	79.26	1	03.86	1	32.44	2
56.88	1	79.95	1 +	04.15	1	35.20	2
57.07	1	80.50	1	04.33	1	36.80	1
57.39	1	81.30	1	05.45	1	37.28	1 +
57.75	1	81.47	2	06.05	2	37.53	1 +
58.38	8	81.85	1	06.68	1 +	37.90	1
58.89	2	82.06	1	07.22	3	38.38	1 +
59.09	1	82.91	3	07.45	1 +	39.11	3
59.41	2	83.13	1	08.10	1	39.35	1
60.03	1 +	84.05	1	08.27	1	39.53	1
60.75	1	84.39	1	08.99	3 (Pr)	40.07	2
60.99	2	84.70	2	09.68	2	40.37	1 +
61.55	2	95.28	1	10.41	2	41.00	1 +
61.70	1 +	85.81	10	10.88	1	41.50	1 +
62.04	2	86.03	1	11.20	8	41.73	1
62.87	1	86.70	1 +	11.45	1 +	43.53	2
63.17	1	87.47	1	12.41	3	43.76	1 +
63.40	1	88.37	1	13.49	1	44.34	1
63.63	1	89.06	1	13.93	1	44.44	2
63.94	1	89.67	1	14.58	2	44.65	1
64.28	3	90.17	2	14.98	1	44.90	1 +
65.09	2	90.83	3	16.14	1	45.11	2
65.36	2	91.29	2	16.71	1	45.40	1 +
66.52	5	91.75	1	17.02	2	46.51	10
67.10	1	92.10	1 +	18.21	2	46.83	1
67.30	1	92.28	2	18.58	1	48.10	2

4449.01	1	4476.00	1	4505.00	1	4533.97	1 +
49.93	1 +	77.40	1 +	05.43	1	34.90	1
50.26	1	77.59	2	05.92	1	35.18	1
51.25	1	78.03	2	06.25	1	35.45	1 +
51.71	10	78.68	2	06.73	4	35.77	1
52.16	3	79.51	1	06.97	1	36.10	1
52.35	1	81.13	3	07.60	1 +	37.72	1
53.80	1 +	82.08	2	08.15	1	37.87	1
55.30	1	83.32	1	08.45	1	38.55	1
55.79	2	83.53	1	09.55	1	39.42	1
56.05	1	83.88	1	09.99	1	40.07	1
56.30	1	84.40	2	10.27	1 +	40.62	1
56.54	3	84.66	1 +	10.97	1	41.42	5
56.75	1	85.15	2	11.45	1	41.65	1
57.05	1	86.13	2	12.00	1 +	42.23	2
57.33	1	86.74	1	12.10	1 +	42.77	4
57.75	1	87.15	1	12.46	1	42.99	1
59.09	1	87.81	2	12.66	1	43.77	1
59.53	1	88.49	1	13.48	4	44.41	2
60.10	1	88.83	1	14.65	1 +	45.48	2
60.31	2	89.32	1	15.03	1	46.65	1
60.97	1	90.95	2	15.55	1	48.40	2
62.56	3	91.36	1	16.30	1 +	49.16	2
63.09	10	91.79	2	16.52	3	52.38	1
63.30	2 +	92.25	1	16.80	2	53.68	1 +
64.30	1 +	92.64	2	17.08	1 +	53.90	1 +
64.39	1 +	93.58	3	17.41	1 +	54.30	1 +
65.21	3	94.10	1	17.90	1 +	54.79	1
65.75	3	95.83	1	18.54	1 +	55.13	2
66.01	2	96.70	1 +	18.75	1 +	55.31	2
66.23	1	97.43	3	20.45	1	56.30	3
66.44	1	98.05	3	21.45	1 +	56.90	3
68.00	3	98.40	1	22.29	1 +	57.12	1
68.24	1 +	98.66	1	23.04	3	57.56	2
68.52	1 +	98.90	1	23.76	2	57.94	1
68.85	1 +	99.05	1	24.2	1 + br	58.88	1 +
69.25	2	99.34	1	24.76	1	59.35	1
69.42	3	99.42	1	25.90	1	59.70	1
70.65	1 +	99.75	1	26.28	1	59.85	2
70.75	1 +	4500.38	1	26.56	2	60.60	2
71.14	2	00.55	1	27.42	2	61.20	1 +
71.56	2	01.06	1	28.40	1	61.36	2
71.77	1	01.41	1	29.36	1 +	62.01	2
72.50	1	01.65	1	30.14	2	62.53	1
73.65	1	01.98	8	30.51	2	63.37	5
74.00	1	02.20	1	31.18	1	63.62	1 +
74.48	1	02.60	1	32.47	1	64.17	1 +
74.90	1	03.34	1	33.05	1 +	64.40	1 +
75.75	2	03.47	1	33.55	1 +	64.74	1

4565·00	1 +	4591·90	1	4633·52	1	4666·33	1 +
65·15	1	92·33	1 +	34·35	5	69·34	2
65·35	1	94·00	1 +	34·58	1 +	69·85	1
65·86	1	94·16	1 +	35·13	1	70·18	1
66·23	1	94·61	3	35·55	1	70·50	1 +
67·54	1	94·91	2 d	36·40	1	70·75	3
67·79	3	97·16	4	36·70	1	71·28	2
68·24	1 +	97·40	1 +	37·34	2	72·70	2 +
69·00	1 +	97·70	1 +	38·82	3	73·68	1
69·45	1	98·55	1	39·25	2	74·15	1
69·89	1	99·51	1	39·50	2	74·38	1
70·05	1	4600·66	1	39·74	1	74·70	1
70·60	1	02·38	2	40·35	1	75·71	1
71·06	1	03·96	3	41·23	3	75·91	1
71·23	1	04·59	1	42·50	2 d	76·45	1
71·90	1	05·98	1	44·98	1	77·30	1
72·28	1 +	06·55	1	45·15	1	77·60	1 +
72·85	1 +	06·95	1	45·92	4	78·38	1 +
73·16	1	07·24	1 +	46·55	2	79·10	1 +
74·06	1	09·38	2 d	46·85	1 +	79·45	1 +
74·20	1	09·75	1	47·95	1	80·92	3
76·00	1	10·00	2	48·13	1	81·45	1
76·64	1	10·33	1	48·87	1	82·30	1
78·40	1	10·70	1	49·83	3	83·66	4
79·01	5	12·62	2	50·40	2	84·22	3
79·47	5	14·02	1	51·20	1	85·06	1
79·70	1 +	15·59	1	51·38	1	85·53	1
80·85	1	15·85	1	51·78	1	87·23	1
81·10	1	16·10	1	52·56	2	88·02	1 +
81·40	1	16·25	1	53·47	1	88·72	1
82·75	1 + br	16·87	2	54·32	1 +	89·19	1
83·35	1	18·22	2	54·49	1	89·65	1
83·81	1	21·00	1	54·88	3	90·55	3
84·21	2	21·39	1	57·39	1	92·50	1
85·01	1	21·74	1	57·76	1	93·17	1
85·24	1	22·10	3	58·03	1	93·83	1
85·60	1 +	22·35	1	58·36	1	94·55	1 +
86·02	1	22·60	1	59·50	1	95·00	1 +
86·21	1	23·21	1	59·55	1	96·63	3
86·40	1	23·99	1	59·65	1 +	97·17	1
86·77	3	24·39	3	60·46	1	97·45	1
87·13	2	26·63	2	60·66	1	98·49	1
87·90	1	28·11	3	61·51	1 +	99·55	1
88·24	1	28·60	1	63·15	2	4700·05	1 +
89·14	1 +	29·40	1	64·18	1	02·19	1 +
90·68	1	30·06	2	64·62	3	02·66	1 +
91·09	1	31·45	2	65·43	1 +	03·25	1 +
91·27	1	31·75	1	65·70	1 + d	03·75	3
91·55	1	32·81	2	66·12	1 +	04·02	2

4706.72	8	4755.15	1 +	4797.06	1	4853.52	3
07.15	2	56.06	2	97.33	3	54.90	2 +
07.75	1	57.75	1	98.21	2	55.47	2 +
08.23	1	58.10	1 +	99.60	3	59.18	5
08.55	1	58.74	1	4802.06	1 +	59.73	1
08.70	1	58.85	1	03.94	1	61.95	1
09.90	5	59.32	2	04.61	1	62.4	1 + br
10.80	1	59.55	1	04.97	1 +	63.73	1
11.13	1	60.66	1	05.29	2	64.36	1
12.05	1	61.75	1	05.66	1	64.96	1
12.14	1	61.96	1	06.35	1	65.45	1
13.25	1	62.63	1	06.80	2	66.90	3
14.41	1	63.51	1	09.26	1	68.00	2
15.75	5	63.81	2	09.63	1 +	69.45	2
17.25	3	64.04	3	10.69	1	73.90	1
19.20	3	64.75	1	10.95	1	74.56	1
20.45	1 +	66.61	1	11.50	5	76.00	2
21.10	1	67.70	1 +	12.85	1	76.25	2
21.44	1	67.85	1	17.31	3	79.97	2
21.87	1	69.50	2	18.70	1 +	80.68	1
24.51	5	70.05	1 +	19.11	2	81.91	1
25.06	1	70.39	2	19.80	2 +	83.06	2
26.55	1	71.25	1	20.49	4	83.99	4
26.74	1	71.77	1 +	21.55	1 +	85.16	1
28.60	1	71.90	1	24.35	1	87.49	1
29.56	1	72.45	1	25.67	8	89.26	4
30.63	1	73.07	3	26.73	1	90.55	1
31.98	3	74.10	1	27.80	1 +	90.86	4
34.10	2	74.37	1 +	27.95	1	91.25	3
35.10	2	75.50	1 +	28.76	2	93.39	2
36.36	2	76.27	1 +	31.00	1 +	94.46	1
38.4	1 + br	77.20	1 +	31.27	1 +	97.09	3
40.1	1 + br, d	77.87	3	32.47	4	99.47	1
42.56	1	78.55	1	33.66	1	4901.72	2
43.50	1 +	79.13	1	34.63	1 +	02.00	3
43.85	1 +	79.61	3	35.50	1 +	02.20	2
44.50	1 + br, d	80.70	1	35.84	1	07.44	1
45.10	1 +	81.16	1	36.16	3	07.96	1
45.55	1	81.65	1	36.80	2	09.53	1 +
48.27	1	83.99	3	43.00	1 +	10.23	2
48.62	1	86.24	3	44.3	1 + br	13.59	3
49.17	1	87.59	2	45.00	1 +	14.52	4
49.28	1	88.18	1 +	45.50	1 +	16.30	1 +
49.71	2	88.50	1 +	46.06	1 +	17.53	1
49.93	2	89.60	4	46.50	1 +	20.84	10
50.20	1	90.47	1 +	47.30	1 +	21.28	1 +
52.70	1	92.80	1	47.73	1 +	22.62	1
53.4	1 + br	94.30	1	49.19	4	24.69	4
54.67	1 +	95.1	1 + br	50.28	1 +	26.87	1 +

4928·0	1 + br	5057·03	1	5221·71	1	5384·05	1 +
29·0	1 + br	63·86	2	25·19	2	86·07	3
30·89	1	66·96	1	28·55	2	87·30	1 +
32·69	1	72·01	1	34·31	4	88·43	1 +
43·10	2	74·01	1 +	39·90	3	93·90	1 +
44·05	2	74·66	1 +	49·70	8	96·90	1
44·97	3	75·79	1 +	50·93	3	99·27	1
47·15	2	76·71	3	55·64	4	5400·35	1
49·15	1	77·30	1	57·55	1 +	03·10	1 +
50·44	1 +	79·23	1	64·35	1 +	06·35	1
50·85	1 +	89·99	3	69·65	1	07·88	1 +
52·64	1	92·95	4	69·95	1	12·13	1 +
54·91	2	96·67	1	70·26	1	14·95	1
55·30	1 +	5102·55	3	70·86	1	16·51	3
55·80	1 +	03·30	1 +	72·18	1 +	17·70	1 +
58·29	1	05·40	2	73·56	5	20·80	1 +
59·28	4	06·79	2	76·99	3	21·71	3
61·54	3	07·74	4	86·83	1	29·48	1 +
63·46	2	19·76	1	87·30	1	30·98	2
65·95	1	21·48	1	91·84	1 +	31·70	4
66·85	1 +	23·92	4	93·35	10	32·54	1
69·90	1	30·75	5	5302·44	3	39·00	1 +
71·05	2	32·49	3	03·35	1	41·43	2
72·85	1 +	37·00	1	06·61	2	42·43	4
73·00	1	43·49	1	08·60	1 +	44·05	1 +
73·57	1 +	49·70	1	10·19	1 +	47·72	2
75·64	2	51·98	1	11·62	3	49·39	2
81·05	1 +	53·25	1	14·73	1 +	50·00	1 +
81·44	2	53·58	1 +	16·75	1	51·28	4
83·06	1	56·18	1	19·28	1 +	55·95	4
87·30	3	61·85	1	19·98	10	56·68	1 +
89·60	2 +	65·28	3	29·30	1 +	57·82	1 +
90·09	4	68·05	2	34·50	1 +	58·35	1 +
96·80	1	71·08	1 +	36·66	2	58·75	1
98·67	2	76·93	2	38·10	1	61·57	1
5000·55	2	79·91	4	45·82	2	69·93	1 +
11·82	1	81·34	2	49·4	1 + br	70·55	1 + br
14·69	1	82·78	2	49·75	1 +	73·25	3
15·58	1	91·62	5	50·50	1 +	74·89	3
27·30	1	92·80	6	57·11	4	75·60	1 +
28·00	2	95·75	1 +	61·40	1 +	78·85	2 + br, d
29·60	1	98·24	1 +	61·66	5	83·30	1 +
32·86	1	5200·29	3	65·29	1	84·20	1 +
33·66	2	04·60	1 +	70·35	1 +	85·22	3 +
34·91	1	11·95	1 +	72·10	4	85·86	8
40·34	1	12·53	3	77·15	1 +	87·20	1
43·65	1	13·40	1	77·94	1 +	91·57	1 +
51·24	1	15·80	1	78·38	1 +	92·50	1
51·80	1	19·7	1 + br	80·20	1 +	93·55	1

5494.20	4	5587.76	1	5699.10	1	5788.35	2
96.60	1	88.11	1	5702.40	3	95.33	2
99.06	1	89.09	2	06.36	3	5800.24	2
5501.69	1	92.80	1	07.53	1 +	04.17	5
03.90	1 +	94.58	10	08.42	4	09.41	2
05.16	1 +	95.98	1	10.53	1 +	11.72	3
07.84	1	5601.61	1	13.20	1	14.05	2
08.58	2	02.06	1	14.10	1 + br	15.59	1
09.30	1	02.81	2	18.30	3	18.94	1
12.85	1 +	03.80	2	19.26	2	20.54	1
16.45	1	05.1	1 + br	24.10	1 +	23.53	2
18.89	1 +	05.8	1 + br	26.47	1 +	24.1	1 + br
19.60	1 +	08.63	1 +	27.02	3	26.02	3
20.20	1 +	11.35	1	28.09	1 +	26.91	2
20.81	1 +	14.44	2	29.49	4	30.90	1
20.94	1 +	15.50	1 +	30.55	1	37.29	1
22.36	1	17.03	1 +	31.32	1	39.23	1 +
24.10	1 +	17.84	2	32.01	1	42.52	3
25.90	2	19.15	1	34.45	1 +	43.35	1
28.51	2	20.75	10	34.73	2	44.85	1 +
29.21	1 +	22.50	1 +	39.05	1	46.10	1
32.26	1	23.76	1	40.15	2	46.53	1
33.57	1	25.52	1 +	41.04	3	47.81	1 +
33.99	4	25.88	2	41.45	1	53.66	1 +
35.48	2	31.65	1 +	42.28	3	54.10	1 +
36.55	1 + br	35.91	1	42.93	1 +	54.60	1 +
37.95	1	39.20	1 +	43.36	2	56.59	1 +
39.00	1 +	39.70	1	44.30	1	56.88	1 +
39.36	1 +	43.43	1	44.92	3	59.10	3
40.95	1	44.3	1 + br	47.04	1	59.85	1
42.53	1	48.20	1	48.30	1	60.44	1
43.39	2	51.45	1	49.22	1	61.35	1 +
46.05	2	52.19	1	49.32	2	62.48	1
46.25	1 +	53.79	1	49.81	1	62.67	1
48.61	3	59.94	1	53.71	2	63.54	1
48.85	2	62.59	1	53.95	1 +	63.75	1
50.29	2	65.9	1 +	55.39	1 +	65.23	3
53.07	1 +	66.75	1 +	60.16	1	67.24	3
55.99	1 +	69.02	3	61.86	2	69.07	3
57.62	2	69.48	1 +	62.20	1	69.81	1
59.24	1 +	69.94	1	62.53	1 +	71.19	2
61.37	2	75.98	1 +	64.36	1	73.55	1
70.11	2	76.12	2	67.50	1 + br	74.60	1
75.65	1	76.48	1	70.04	2	76.48	1
76.84	1	77.99	1 +	70.65	2	77.97	2
77.85	1 +	88.67	5	72.33	1	78.33	1 +
78.0	1 + br	89.65	1	76.26	2	80.50	1
78.79	1	90.43	1 +	83.80	1 +	81.48	1
81.75	2	97.4	1 + br, d	85.09	2	82.99	2

5883.49	3	5982.24	1	6065.40	1 +	6136.09	1
86.40	1	84.55	1 +	66.25	4	41.47	1 + d
88.06	3	84.90	1 +	67.16	1 +	42.60	1
90.66	2	88.30	2	67.30	1 +	44.68	1 +
91.70	3	89.48	3	68.94	1	48.71	1
92.85	1 +	90.40	1	69.90	1	49.41	3
99.05	1	90.86	1	71.90	4	50.45	1
99.66	1	94.19	1	73.31	1	52.94	1
5900.64	2	94.94	3	74.19	4	55.22	3
02.32	1	96.65	3	74.67	2 +	56.35	2
06.83	3	97.15	1 +	77.40	2	56.75	2
10.07	3	6000.25	1	77.66	1	57.08	1 +
10.45	1	02.50	1	80.81	1	58.01	3
14.60	2	02.74	1	81.76	1	59.45	1 +
14.88	1	04.16	1	82.25	1	61.42	2
17.63	1 +	04.52	1	84.79	2	61.71	3
21.43	2	06.55	1	87.14	2	62.39	3 (Ca)
22.96	2	07.81	4	87.70	1	62.52	1
29.13	1 +	09.46	2	88.10	1	64.60	1
31.65	1	11.05	1	91.48	1 +	65.84	1
32.31	1 +	11.70	1	91.80	1	66.13	1
32.65	1 +	15.45	1	92.25	1	66.84	3
34.96	2	17.88	1	97.99	1	68.25	1
35.7	1 + br	20.40	1	98.39	1	69.30	1 +
39.95	1 +	20.65	1 +	99.13	1 +	70.68	4
41.30	1 +	22.20	1 +	99.40	1 +	70.96	1
43.40	3	22.80	1	6101.41	2	72.74	1
47.58	1	23.51	1	02.93	1 +	74.46	1
48.83	1 +	23.75	1	04.28	1	76.25	1
49.83	2	25.70	1	04.60	1	78.35	1
50.70	1 +	31.49	3	05.70	1	78.72	5
53.27	1	33.47	3	06.95	1 +	80.95	1 +
56.06	2	34.41	3	07.95	1 +	81.80	1 +
61.32	2	35.75	1	08.59	3	83.23	1
62.63	1 +	38.66	1	09.22	1	84.09	3
63.45	1	41.20	1	09.84	2	84.40	1
66.56	1	43.93	1	12.20	1 +	87.15	1
66.90	1	50.01	1 +	13.65	2	89.64	1
67.11	1	50.70	1 +	14.60	1	91.85	1 +
68.45	1	52.09	2	17.38	1 +	92.50	1 +
72.69	1	53.99	1	22.39	3	95.27	1 +
74.45	1	54.67	1	23.16	1	96.02	1 +
74.75	1	56.45	1	26.50	1 +	96.38	1 +
75.64	1	57.20	1	29.35	1	98.77	1
76.50	1	57.55	1	30.75	1	6201.91	3
77.65	1	57.81	1	31.96	1	06.27	1 +
78.11	1	58.52	1	33.70	2	08.18	2
78.97	1	59.01	1 +	34.15	1	08.40	3
80.14	1	61.24	1	35.43	1	10.84	1

6212·95	1	6302·50	1 +	6425·05	1	6510·20	1 +
16·81	2	05·45	1	25·98	3	15·20	3
18·30	1	06·00	1	27·26	1 +	20·11	2
20·19	1	07·24	1	28·83	4	20·48	1 +
21·30	1 +	08·46	1	30·06	1	21·22	1 +
22·30	1	10·69	10	31·39	1 +	23·39	2
23·57	5	12·95	2 +	31·92	1	40·13	2
26·68	3	13·44	1	32·82	2	41·3	1 + br
27·36	1	17·90	1	33·40	2	44·0	1 + br
28·09	1	19·88	3	33·71	1	49·71	2
30·20	1	21·33	1 +	35·13	1	50·41	2
30·49	1	22·26	1 +	36·20	1 +	51·90	1 +
38·68	3	27·15	1 +	40·05	1 +	53·23	1
43·50	1	28·63	2 +	45·95	2	59·19	1
44·23	4	30·38	3	47·68	1 +	64·13	1
48·42	3	32·10	1 +	49·00	1 +	64·45	1 +
50·62	2	39·05	1	50·88	1 +	68·70	1
52·00	2	41·69	10	51·40	2	69·85	1
57·70	2	46·52	1 +	55·01	1	72·15	1 + br
58·92	4	46·72	1 +	55·25	1 +	72·87	1
60·9	1 + br	48·03	1 +	57·33	2	76·10	1 +
63·40	2	52·16	2	58·13	1 +	79·80	1 +
64·55	1	54·95	1	61·38	1 +	80·94	1
68·80	1	56·10	1 +	63·76	2	81·19	2
69·66	1	56·74	1	65·20	1 +	84·76	1
70·52	2	58·60	1	65·44	2	85·90	2
71·76	1 +	61·09	1	70·95	1 +	88·23	1
71·97	1	61·65	4	71·85	1	89·25	1
73·00	1	62·28	4	73·80	1 +	91·18	1
77·50	3	65·18	1	74·46	1	95·24	1
78·41	1	65·72	3	76·40	1	6602·00	1
79·15	1 +	66·95	1 +	78·98	1 +	04·62	1 +
79·60	1 +	72·99	1	80·06	1	09·90	1 +
79·90	1 +	76·16	3	80·45	2	12·24	1 +
82·20	2	77·46	1	81·85	1	16·15	1
82·65	1 + d	78·80	1 +	82·50	2	18·75	1 + br
85·99	3	82·29	5	83·65	1	19·55	1
86·25	1	84·85	1	84·59	1	24·4	1 + br
87·41	2	85·32	15	85·90	5	25·6	1 + br
87·75	1	90·19	4	87·70	1	30·35	3
90·08	1	91·70	1 +	89·41	1	37·42	2
92·20	1	95·13	1 +	92·57	2	38·19	3
93·03	3	97·08	1 +	95·80	1	50·79	3
93·80	1	6403·42	2 +	97·58	1	55·90	1 +
97·28	3	04·17	1	6500·37	2	67·75	1 +
98·60	3	07·03	1	02·10	1	69·85	1 +
6301·16	1	08·65	1 +	04·68	2	78·70	1 +
02·00	1 +	14·24	1 +	05·10	1 +	80·39	1
02·16	1 +	14·51	1 +	07·48	1 +	6738·02	1 + br

6740·35	1	6790·70	1 +	6804·27	1 +	6847·00	1 + br
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XLIV. Nh. Neoholmium.

Ältere Messungen: G. Eberhard, Publ. d. Astroph. Obs. Potsdam, 20

(1909). J. M. Eder und E. Valenta, Wiener Ber. 119 II a (1910) (Rot).

Material: Neoholmiumnitrat von C. Auer von Welsbach, auf Gaskohle.

Verunreinigungen: Ad, Y.

Linienzahl: 1482.

2713·75	1	2862·83	1	2955·09	1	3020·63	2
34·04	2	66·86	1	55·39	1	22·28	1
50·46	2	72·10	2	59·05	1	23·25	1
59·45	1	72·55	1	61·16	1	24·50	1 d
66·97	1	73·99	1	61·59	1	26·25	1
69·99	2	74·19	2	64·62	2	28·30	1
72·91	1	74·55	2	68·89	1	31·24	1
73·98	1 +	80·38	3	70·66	1	31·39	1
77·20	1	81·10	3	72·55	1	33·55	1
94·00	1 +	82·15	1	73·12	3	35·76	2
94·51	1	84·77	1	75·36	1	36·32	1
2800·07	1	91·51	2	75·80	1	38·40	1
06·82	1	95·10	3	76·44	1	38·81	2
09·20	1	95·74	2	78·19	1	44·50	1
10·10	1	97·68	1	79·75	3	47·55	1
11·46	2	2900·95	2	80·76	1	49·50	3
12·10	2	02·30	1	81·58	2	50·84	2
14·52	1	04·60	2	84·19	1	52·46	1 +
14·85	2	09·53	4	84·35	1	54·11	3
15·00	1	10·49	2	85·60	2	54·98	2
19·90	1	15·95	2	87·76	3	56·65	1
23·47	1 +	19·75	2	88·03	1	60·36	1
23·75	1 +	21·96	1 +	90·38	2	60·97	1
24·30	3	26·20	1	92·80	1	62·65	2 d
26·74	1	27·10	1 +	95·98	1	63·26	1
31·80	2	28·42	2	98·40	1	64·10	1 +
35·10	2	36·35	1	3000·81	1 +	64·31	2
35·96	1 +	41·10	1	02·50	2	66·34	1
43·53	1 +	42·15	2	02·75	1	67·55	1 +
44·29	1	42·70	1	03·95	1 +	70·87	1
44·80	1	44·61	2	05·41	1 +	72·62	1
49·21	2	45·94	1	07·20	1	73·07	1 +
53·01	1 +	47·29	1 +	09·60	2	73·43	2
59·97	1	52·48	1	12·19	1	73·80	1
60·98	1	52·85	1	14·71	2	74·42	2
61·34	1	53·23	3	17·85	1	75·30	1 +
61·60	2	54·40	1	18·27	1	75·65	2

3078.45	1	3144.49	4	3183.98	3	3230.14	1 +
78.51	1	45.75	1 +	84.50	2 +	30.70	3
79.01	1	46.27	2	84.66	2 +	31.05	1
80.90	1 +	47.09	1 +	85.37	1	31.77	1
83.56	2	47.70	1	85.63	1	32.16	1
84.11	1	48.98	2	87.54	2	33.49	3
84.48	4	50.09	2	88.74	1	34.00	1 +
85.86	1	51.16	1	90.05	1	34.65	1
86.66	4	52.50	1	90.84	1	35.75	1 +
89.92	1 +	53.18	1 + d	91.15	2	36.00	1
94.59	1	53.60	1	91.47	1 +	36.70	1
95.47	1	53.83	1 +	92.60	1 +	37.05	2
95.99	1	53.91	1	93.40	1	37.54	2
97.55	2 +	54.41	1	94.59	1	38.10	1
99.31	1	56.31	3	95.24	2	38.28	1
3102.01	1	56.65	2	96.08	1	38.84	1
02.82	2	57.09	3	96.20	1	39.17	1
05.31	2	57.48	2	96.65	1	40.55	2
06.20	1 +	58.53	2	97.09	2	41.60	1 +
06.96	1 +	59.80	3	97.44	1	42.11	1
07.05	1 +	60.27	1 +	97.96	3	43.13	1 +
08.45	3	60.60	2 +	99.80	1 +	43.40	1 +
08.78	2	61.64	1 +	3201.13	1	45.25	1
10.05	3 d	62.96	1	01.90	3	46.79	1
11.98	1	64.22	2	02.67	1	47.35	1
13.68	2	65.83	2	04.41	2	49.46	1
14.50	1	66.45	1	04.89	1 +	50.34	1
14.73	1	66.75	5	05.97	1 +	51.40	2
14.80	1	67.25	1	06.30	1	51.80	1
17.10	1	67.53	1	06.99	3	52.30	1
18.63	4	68.01	2	07.86	1	56.43	2
22.79	2	68.65	1	08.15	1	57.53	3 d?
24.51	1	68.90	1	08.78	1	58.18	1
25.80	1	69.84	2	10.52	3	58.57	2
28.55	1 +	70.15	1	11.98	2 +	59.24	2
29.34	1	71.84	5	12.80	1	59.38	1 +
30.90	2 +	72.50	2	13.39	1	62.34	2
31.12	3	72.98	1	14.53	1	62.99	1
31.37	1	73.19	1	15.48	2	63.14	1
32.66	1	73.92	3	20.20	1	63.79	2
32.90	1	74.06	2	20.48	1	64.91	3
34.53	3 d	74.99	3	20.85	2	65.70	1 +
35.01	1	75.64	1	21.00	2	66.48	2
37.97	1 +	76.77	1	21.56	2 +	67.26	1
40.26	1	77.09	3	23.42	2	67.50	2
40.79	1	80.00	1	24.40	1	68.85	1 +
41.26	2	81.65	4	25.40	1 +	69.25	1
42.70	1 +	82.05	2	27.29	1	69.55	1
42.96	1	83.56	2	29.25	1 +	69.79	1 +

3271.10	1	3321.25	2	3374.50	1 +	3420.89	1
71.50	1 +	22.77	1	75.24	1	21.78	10
72.25	1	23.07	1	80.64	1	24.14	1
75.30	1	23.34	2	80.78	2 +	24.25	1
75.60	1	23.89	2	81.25	1	25.49	20
76.38	2	29.16	2 +	81.48	1 Er	26.90	3
77.29	2	29.80	1 +	85.19	5	28.27	20
78.29	5	31.15	1 +	86.55	1	29.33	5
79.40	4	32.05	2	88.55	1 +	32.23	3
80.27	1	32.51	1	89.00	1	34.51	2
80.36	2	33.30	2	89.70	2	34.90	2
80.89	1	34.0	1 + br	89.89	1	35.75	2
81.32	2	35.21	2 +	90.89	3	36.43	2
82.12	6	36.47	1 +	92.19	3	37.17	2
82.93	1	37.34	6	92.53	1 +	38.05	2
83.22	2	37.93	1	93.15	1	38.47	1 +
84.25	1	38.90	6	93.74	3	41.57	1
86.31	1	40.15	2	94.77	4	42.80	1
88.60	3	40.55	2 +	96.29	2	45.70	3
89.52	5	41.13	1	97.00	1	47.12	1
91.10	4 d	42.83	2	97.45	1	49.14	1 +
91.40	1	43.70	10	98.41	1	49.47	2
93.97	1	44.60	2	99.12	20	50.01	1 +
94.84	1	44.90	1 +	3400.74	1	51.35	1
95.95	1 +	46.17	2	01.75	2	51.86	1
97.19	2	48.71	2 +	01.93	1 +	53.28	15
98.26	2	50.60	3	02.33	1	54.00	1 +
99.56	1 +	52.22	3	03.40	1 +	54.45	2
3301.48	1	53.60	3	03.9	1 + br	55.85	3 +
02.51	1	53.71	3	04.05	1 +	56.15	30
04.06	1	54.71	3	05.25	1	56.68	1 +
04.53	1	56.13	1	06.41	2	56.9	1 + br
04.90	1	57.12	2	07.32	1	58.03	1 +
05.30	3	58.04	3	07.97	3	58.59	1
05.70	1	59.65	1 +	08.35	3	59.6	1 + br
07.00	1	61.01	2	09.20	3	61.10	3
09.00	2	61.36	2	10.39	10	61.50	2
10.30	1	62.76	1	10.79	5	62.11	10
12.55	3 v	63.55	2	11.70	3	62.70	1
12.85	1 +	64.24	2	13.02	1	64.01	1
14.15	1 + br	64.41	2	13.93	2	64.51	2
15.80	2	68.19	2	14.37	1	64.65	1
16.50	2	69.91	1	14.49	2	67.22	4
17.61	1	70.67	1	15.06	15	68.58	1
18.33	1 +	71.00	3	16.60	15	69.54	2
18.90	1 +	72.55	1	17.77	1 Er ?	69.85	1
19.45	1 +	72.93	6	18.30	1	70.9	1 + br, d
20.01	3	73.49	1 +	18.39	1	71.85	2
20.38	3	74.30	3	19.75	1	72.40	3 d

3474·07	5	3536·19	2	3593·10	3	3626·22	1
74·40	20	37·60	2	93·28	3	26·85	10
77·21	2	38·62	2	93·61	1	27·33	8
77·89	2	39·03	2	94·26	1	27·75	1
78·20	3 d	39·50	2	94·75	1	28·16	2
79·55	1	40·91	3	95·16	2	28·83	2
80·58	1	41·56	1 +	96·23	1	29·05	2
80·97	1 +	42·49	1 +	97·55	1	30·39	2
82·35	1 +	44·22	4	98·92	20	31·06	1
84·05	1 +	45·07	4	99·62	2	31·90	4
84·98	20	46·12	10	99·95	2	33·66	2
86·01	3	46·98	1	3600·51	1	34·05	1
86·49	1 +	47·73	1	00·88	3	34·49	1
86·98	1	48·31	2	01·10	3	34·83	3 +
89·74	5	48·66	2	02·02	3	35·43	2
91·10	3	49·10	3	02·18	2 +	36·05	1 +
93·25	5	50·00	1	02·65	1 +	36·45	1 +
93·75	1 +	50·34	2	02·80	1 +	37·31	1
94·25	1 +	51·78	1	02·94	1 +	37·41	1
94·65	2	56·91	8	05·04	1	38·47	4
94·92	15 d	59·19	2	05·92	1	38·84	2
97·00	1	60·30	3	06·26	2	39·14	1
99·02	4	62·80	1	07·57	1	40·05	1
99·23	5	63·29	2	08·30	1 +	40·38	2
3501·60	1	63·60	2	10·85	1 +	41·03	1
01·90	1 +	66·32	2	11·70	1 +	41·40	2
02·48	1 +	67·47	1	12·99	1	42·04	1
02·91	1	70·50	2	13·16	2	42·51	2
03·33	1	70·85	1	13·48	3	44·15	1 +
03·76	1 +	72·76	1	14·23	1	45·56	4
04·65	1	73·37	4	14·80	1	46·02	2
05·20	1	73·96	1	15·90	1 +	46·43	1
05·59	1	74·25	1	16·20	1	46·75	1
07·09	5	74·93	5	16·71	3	47·54	1
08·14	1	76·40	2	17·08	2 + d	48·56	1 +
08·50	1	77·00	1	17·37	1	48·95	2
09·50	3	78·15	1 +	17·99	1	49·77	1
10·85	2	79·27	2	18·25	2	50·45	2
11·91	2 d	80·89	2	18·60	2	50·95	1
13·20	1	81·97	1	19·58	3	52·75	2
15·73	20	84·64	1	19·90	1	53·01	2
18·25	1 +	85·18	1	20·15	1	53·15	1 +
20·07	5 +	87·93	1	20·30	1	54·60	3
20·31	4 +	88·83	1	20·73	1	55·04	1
20·91	1	90·87	1	22·53	1	55·78	1 +
24·14	2	91·38	2	23·30	1	56·55	1
25·04	1	91·52	2	23·74	2	58·50	1 +
31·89	5	91·95	1	24·47	1 d	58·63	2
35·09	2	92·37	4	25·61	3	58·79	1 +

3659·70	1	3686·19	1	3711·84	2	3757·41	20
60·40	1 +	86·50	1	11·98	1	59·40	1
60·86	1 +	86·80	3 d	12·55	2	59·89	1
61·67	1	88·13	1	13·05	3	60·63	2
61·91	1	89·25	2 +	13·61	1	61·47	1
62·42	10	90·05	1	14·01	2	62·06	1
63·13	3	90·38	1	14·82	1	62·20	1
64·10	1	90·50	1	15·30	1	65·39	1
65·36	1	90·80	2	16·60	1 +	66·37	3
66·80	3	91·41	3	17·39	1 +	66·96	1
67·20	3	91·60	3	18·06	2	69·22	2
68·12	5	92·10	2	18·77	2	71·23	2
68·69	1	92·80	5 r	19·47	1 +	72·54	2 +
69·20	3	93·63	1	20·89	3	73·98	1
69·67	3	93·86	1	21·48	4	75·00	1
70·10	1	94·39	5	21·98	4	75·80	1
70·44	3	94·84	1	23·51	1	76·30	2
70·85	1	94·97	2	23·77	1	76·70	2
71·80	3	95·84	2	24·60	3	81·15	2
72·45	3	96·05	1	25·10	1	86·30	3
72·84	2	96·41	2	25·20	1	86·95	2
73·31	1	97·10	1	26·14	3	88·20	2
73·50	1 +	97·46	1	28·15	1 +	88·57	2
74·25	2	97·84	1	29·68	3	91·98	2
74·51	3	98·35	2	31·55	4	96·88	10
74·92	4	99·13	1	31·94	1	98·40	2
75·68	2	3700·18	2	32·24	3	3801·45	3 +
76·25	1 +	00·43	2	32·74	3	03·70	1
76·74	3	00·73	1	34·25	1	03·81	1
77·77	3 (Fe)	00·87	2	36·50	3	04·30	2
77·90	2 +	01·42	1	37·80	3	10·46	1
78·24	1	01·50	1	38·28	1	10·85	10
78·76	3	01·77	1	39·46	1	11·99	1
79·34	3	01·95	2	40·10	1 +	13·39	8
79·85	3	02·50	5	42·55	1	13·80	1
80·15	2	03·35	1 +	42·76	2	16·89	1
80·90	1 +	04·70	2 +	44·20	1	30·64	1
81·74	1	05·15	1 +	45·15	1	35·50	1 +
82·15	2	06·70	1	45·22	1	37·60	1
82·80	3	06·90	1 +	47·57	1 +	37·75	1
83·23	2 +	07·05	1 +	47·97	1	41·46	1
83·95	2	07·39	1	48·32	30	42·20	1 +
84·16	1	07·56	1	48·99	1 +	44·01	3
84·46	1	07·79	2	52·32	2 +	46·83	1 +
84·65	1	08·00	1	53·16	1	54·23	4
85·10	1 +	08·37	1	53·63	2	57·13	1 +
85·31	3	09·92	2	53·90	10	63·02	1
85·53	1 +	10·90	4 +	54·60	1	71·55	1
85·95	1	11·45	3	56·70	1	72·29	3

26	1 +	3922-05	1	3969-76	1	3998-43	5
35	2	23-52	3 +	70-20	1 +	99-26	1 d
29	1 +	24-70	2 +	72-75	1	99-71	3
20	1 +	25-79	2	72-83	1	4000-60	5
50	1 +	29-48	1	73-20	2	00-77	2
24	1	30-06	2 +	73-74	2	01-40	1 +
10	20	30-80	1	73-95	2 + d	01-53	1 +
55	1	31-24	1	74-85	3	02-68	2 +
57	2	31-68	2	76-03	2	02-85	3
7	30	31-87	1	77-01	4	03-51	3
35	2	32-40	2	77-20	3	04-21	1
0	2	36-51	2	78-70	3	06-05	1
25	3	36-66	3	78-91	2 +	06-20	1
9	2 d	37-15	2	79-26	1	08-11	4
8	1	37-81	1	79-60	2	08-31	2
9	3	38-16	1	80-30	1	09-31	2
0	5	38-75	2	80-75	1	10-20	1
1	2	38-99	2	82-10	2	11-45	2
2	2	40-24	1	82-19	2	12-11	2
0	3	40-52	3	82-49	1	12-70	2
2	2	40-70	5	82-73	3 Y?	13-70	1 +
4	2	41-95	1	82-90	1 +	13-99	1
0	1	42-67	2	83-30	1	14-33	3
8	1	43-31	1	83-80	3	14-85	2
9	4	44-53	1	84-26	3	15-32	1
0	1	44-82	3	84-84	1 +	15-74	1
4	1	44-97	2	85-79	4	16-15	2
4	1	47-06	1	85-95	3	17-65	1
0	2	48-20	1	86-55	1 +	18-10	2 +
0	8	48-79	1 +	86-70	1 +	18-25	3
3	5	49-15	1	86-83	1 +	18-64	1
1	3	49-53	1 +	87-21	1	20-66	3
0	1	50-65	2	87-70	1	21-00	1
1	1	52-12	1	88-13	4 r	21-70	1
5	1	53-84	1	89-25	1	22-15	1
9	1	54-70	2	89-56	1	22-87	2 +
5	2	55-20	2 d	90-50	1	23-01	3
9	2	55-89	3	91-46	2	23-88	1
1	1	57-54	2	92-00	1	24-08	1
0	2	57-94	2	92-40	1 +	24-21	2
5	1 +	59-66	2 +	92-70	1 +	24-56	1
5	2	59-83	2	92-87	2	25-04	1
4	1 +	59-99	2	93-00	1 +	25-54	1
5	1 +	62-74	1	93-86	5	27-35	3
0	1 +	63-42	3	94-68	1	27-92	1
9	1 +	64-62	2	95-45	1	28-49	1
9	1 +	66-50	1	96-32	1 +	28-56	1
0	2	67-00	1	96-85	3	29-00	2
5	2	69-55	1	97-32	3	31-90	1 +

4032.03	1 +	4081.40	2 Er	4172.39	1	4256.51	2
32.64	2	83.82	3	73.39	10	58.78	3
33.83	1	85.24	1	73.66	2	64.23	5
33.93	1	87.50	1	83.83	2 +	66.20	4
35.87	1	87.80	3	87.00	3	66.75	1
36.25	1	91.74	2 +	87.79	2	69.70	2 +
36.49	2	92.20	1	91.84	2	72.09	1 +
36.70	2	97.04	2 (Cy)	94.50	4	73.79	3
37.75	3	98.27	2	95.04	3	75.26	1 +
38.66	1	4100.74	1	98.24	2	76.65	1
39.01	4	01.24	3	4201.50	1	76.85	1
40.99	8	03.45	3	02.40	1	77.33	1
42.13	1	03.99	10	03.37	2	78.20	1
42.40	1	04.45	1	03.55	2	81.00	1 +
43.15	1	05.19	2	03.93	1	81.87	2 +
45.58	20	06.00	1	04.84	2	84.70	3
46.10	10	06.65	2	06.74	1	86.70	3
47.10	1	07.51	1	11.40	3	90.33	3
47.65	3	08.78	10	11.89	5	92.22	1 +
48.50	1 Er	10.06	2	13.31	3	95.17	3
48.94	1	11.50	2	15.30	2	96.47	1 +
49.65	1	12.14	2	16.70	1 +	98.5	2 + br
50.73	2	12.81	1	16.90	1 +	98.8	2 + br
52.48	1 +	13.87	1	18.23	3	4301.25	3 +
52.60	1 +	16.88	2	18.59	2	01.78	3
53.30	1 +	19.50	3	19.26	1	03.99	1
54.07	10	20.35	5	21.23	4	08.81	4
54.64	4	24.80	1	21.84	1 +	11.20	3
55.30	1	25.80	4	22.42	3	15.20	2 +
55.64	2	27.31	10	23.63	3	20.10	1 +
56.00	1	29.59	3	25.29	3	24.36	2
57.70	2 d	31.69	1	29.65	5	25.30	2
58.70	1 +	34.02	1	30.33	2	26.55	1 +
59.53	1 +	34.71	3	31.01	1	29.15	1 +
59.66	1	35.23	1	31.40	1 +	30.80	5
59.95	2	36.39	4	32.16	2	32.71	3 + d
60.45	3	41.74	1 +	33.10	1 +	33.55	1
61.17	1 +	42.34	2	34.95	1	34.15	1 +
62.20	1	43.02	3 Y?	39.99	2	35.90	1 +
63.13	1	43.26	1	42.30	1 +	37.29	5
65.25	10	46.23	2	43.92	3	39.82	1
67.19	2	49.12	1	45.55	3	40.42	1 +
67.73	2	51.29	3	46.05	1 +	45.60	1
68.20	3	52.70	5 +	47.50	1 +	46.82	3
69.07	1	52.91	4	48.15	1 +	47.12	3
72.80	1	60.03	1	49.10	1 +	48.50	1
73.28	3	63.19	5	49.53	1 +	50.90	10
78.15	3 +	67.69	1 +	52.13	2	52.15	1
79.55	1	68.18	3	54.59	20	56.90	8

4358.64	1	4431.56	2	4594.20	1	4729.23	1
58.90	3	33.40	1	94.80	1	31.80	1
60.10	1	39.59	1	95.29	1	32.05	1
60.80	1 +	44.80	2	4606.80	3	38.18	1
64.10	4	45.24	2	08.85	3	42.22	10
64.35	2	47.40	3	09.50	4	49.20	2 + d
66.90	1	49.85	3	09.70	4	51.70	2
69.05	1	56.80	1 +	12.45	3	54.50	1
69.34	1	59.40	1	13.45	1	55.19	1 +
69.55	1	60.17	1	13.55	1	57.19	2
69.75	1	63.55	2	14.19	1	59.85	2
70.15	2	63.82	2	17.48	1	62.57	2
71.59	3	67.45	1	19.02	1 +	62.83	1
73.50	2	68.31	1	20.23	1	63.75	1 d
74.27	1	71.55	2	28.40	2	66.61	1 +
74.45	2	73.75	3	28.89	1	72.13	1 +
76.75	2	77.80	5	29.28	8	77.66	2
76.87	2	81.09	1 +	31.06	1	79.60	1 +
79.31	3	82.75	1	38.37	2	81.37	1 +
80.00	2	84.74	4	38.48	2	83.10	1 +
80.63	1	87.65	1	40.79	1	87.77	1
81.85	1	90.56	1	47.43	2	91.66	1
84.92	3	91.25	1	49.95	8	92.91	1 +
85.11	3	94.05	2	51.57	2	95.67	1
86.56	1	4500.94	2	52.89	1	96.10	1
88.86	1	03.45	2	55.00	1	96.48	1 +
90.70	2	10.98	3	58.00	1	4801.50	1 +
93.38	1	11.50	1	61.51	5	07.00	1
93.80	1	12.71	3	64.88	1	08.69	1 +
95.15	2	13.20	2	65.65	1	13.10	1 +
98.21	4	26.12	2	74.80	4	14.90	1
4400.71	3	26.31	3	75.81	3	20.54	2
01.40	3	30.25	3	79.25	1	23.50	1
03.44	3	31.45	3	82.52	1	31.35	1
04.30	1 +	31.79	5	83.26	1	32.49	3
04.50	1 + Ti?	34.75	2	86.01	3	33.50	1 +
09.52	3	49.10	3	87.57	1	33.97	1 +
12.05	1 +	58.58	2	88.38	2	55.80	1 +
15.96	1 +	62.70	3	90.72	1	68.40	2 +
16.70	1 +	63.48	1	93.05	1	89.85	1 +
18.85	1	68.00	2	93.80	1	96.62	1
19.45	1	68.15	2	4701.34	2	4907.17	2
19.76	3	72.61	2	01.87	2	39.19	3
20.71	4	78.01	2	10.02	3	48.36	1
22.72	3	80.20	2	11.7	1 + br	59.60	1 +
24.71	1	88.14	1	17.70	2 +	67.39	5
26.36	1 d	89.10	1	22.90	1	80.15	2
26.93	1	89.58	3	24.74	1	95.23	1 +
29.96	3	89.94	2	28.90	1	5013.46	1

5042·55	1	5251·99	1 +	5360·17	2	5922·00	1 +
93·25	1	75·65	1 +	5860·50	1 +	83·13	1 +
5193·02	1 +						

XLV. Ni. Nickel.

Ältere Messungen: B. Hasselberg, Stockholm. Akad. 28 (1896).

L. Stütting, Ztsch. für wiss. Phot. 7 (1909).

Material: Metall von Trommsdorff.

Verunreinigungen: Ag, Co, Cu, Fe, Mg, Mn, Pb, Sn, Zn.

Linienzahl: 976.

2216·52	1	2314·07	2 +	2376·12	1	2467·07	1
23·04	1	16·14	2	79·81	1	72·21	1
24·94	1	17·22	2 +	80·94	1	72·32	1
26·41	1	18·88	1	84·50	1	73·03	1
44·6	1 +	20·19	4 u	85·10	1	73·27	1
53·75	1 +	21·55	3 +	86·70	1	76·99	1
53·97	1	22·07	1	87·67	1	79·90	1 +
64·60	1	22·81	2	87·87	1	83·40	1
70·34	1	24·79	2	89·01	1	84·16	1
74·0	1 +	25·90	3 +	93·10	1	84·26	1 +
74·8	1 +	26·56	1	93·20	1	88·26	1
78·90	1	30·10	2	94·66	2	89·13	1
79·7	1 +	31·83	1	96·50	1	90·78	1
86·78	1 +	34·70	1	96·79	1	91·29	1
87·23	1	37·20	1 +	2401·95	1	92·27	1
88·54	1 +	37·60	1 +	12·80	1	2501·26	1 +
90·12	1 +	37·95	1 +	16·26	2	10·99	2
93·25	1 +	38·6	1 +	19·44	1	11·06	1
94·01	1 +	45·60	2 u	21·36	1	24·30	1
96·69	1	46·21	1 +	23·47	1	28·14	1
97·26	1	46·73	1	23·80	1	29·15	1
97·60	1	47·61	1	24·16	1	32·20	1
98·36	1	48·83	1	32·34	1 Co?	36·06	1
2300·90	1 +	50·59	1	34·53	1	40·14	1
01·68	1 +	53·81	1 +	36·80	1	44·35	1
03·10	2	55·15	1	38·00	2	46·01	1
06·55	1 +	56·70	1	39·15	1	47·51	1
07·45	1	56·99	1	40·02	1 +	53·49	1
08·27	1	58·99	1	41·76	2	59·86	1
09·60	1	60·75	1	41·90	1	61·55	1
10·15	1	62·19	1	50·57	1	62·22	1 +
11·09	3 u	65·78	1	51·14	1	67·47	1
12·43	3 u	67·47	1	54·11	1	74·48	1
13·72	1 +	75·54	1	65·40	1	78·55	1

2	3031.98	3	3210.00	2	3326.80	1
1 + (Co)	36.19	1	13.53	2	27.52	1
1	38.04	15 u	14.17	4	28.85	2
2	45.15	4	16.93	3	32.31	2 +
1 +	48.98	1	17.93	4	34.31	1
1	50.92	20 u	19.92	1	35.72	1 +
1	54.42	10	21.41	3	37.15	1
3	56.33	1	21.81	5	37.98	1
1	57.76	15 u	23.66	1	38.90	1
1	63.53	1	25.19	6	39.20	1
3	64.75	6	27.11	4	54.55	1
2	66.59	1	33.06	10	59.30	2
1	76.01	1	33.28	2 +	61.44	1
2	80.91	5	34.00	1	61.75	6
1 +	97.00	1 +	34.78	5	62.28	1
2	97.27	5	35.86	1	62.97	2
4	99.25	4	43.20	8	63.76	2
2	3101.67	10 u	45.47	1 +	64.75	2
2	01.99	10 u	48.56	4	65.92	5
1	05.60	5	49.55	3	66.32	5
1	07.83	2	50.90	5	66.95	3
2	14.26	5	64.56	1	68.05	3
1	16.84	1	68.21	1	68.98	1
1	21.55	1 + d	69.08	1	69.71	15 u
3	29.42	3	71.25	4	72.19	6
2	32.68	1	73.62	1 +	74.42	4
1 +	34.22	30	76.66	1 +	74.82	4
1 +	37.43	1	77.35	1 +	75.70	1
1	45.23	1	79.96	1	76.46	1
1	45.82	3	82.03	2	80.71	10 u
6	51.33	1	82.81	3	81.01	3
1	54.68	1	82.96	3	85.34	1
1	59.65	1	83.65	1 +	87.54	1
2	64.30	1	84.56	1	88.26	1
1	65.64	1	87.08	4	89.5	1 +
1	70.86	1	87.36	1 + Co?	91.20	10
8	76.44	1	93.83	1	93.10	20 u
2	81.89	3	96.42	1	96.31	2
4	83.14	2	3305.10	2	97.37	1
2	83.40	2	07.16	1	3401.31	3
6	84.50	4	09.56	1	03.58	3
8	91.97	1	10.35	2	09.74	5
15 u	94.20	1	12.49	3	13.66	5
10 u	95.67	3	13.15	2	14.12	4
1	97.22	5	15.82	10	14.91	30 u
15 u	99.44	1 +	20.42	8	20.88	2
1	3200.50	3	20.92	2	21.49	3
4	02.21	3	21.36	1	22.47	1
1	07.05	1	22.50	8	23.00	1

3423·87	10	3524·68	50	3688·59	3	3972·32	2 r
33·74	15	26·67	1	89·43	1	73·71	4
35·63	1	28·13	4	94·07	3	74·82	2 +
37·45	8	28·70	1	97·05	1	78·78	1
42·17	1	29·02	1	3713·50	1	84·29	1 +
42·67	1	30·73	2	13·84	1	86·97	1
43·03	1	37·35	1	15·65	1	87·25	1
43·14	1	37·72	1 +	22·64	5	94·15	1 +
44·36	2	42·14	1	24·95	1	4006·30	1
46·40	30 u	45·30	1	29·06	1	17·67	1 +
53·02	10	48·32	6	30·90	1	22·8	1 + br
55·35	1	51·71	3	36·98	4	24·15	1 + br
58·60	20	53·64	3	39·40	3	25·6	1 + br
61·80	20	60·05	1	39·94	1 d	26·47	1
64·25	1 +	61·90	3	44·72	2	27·8	1 + br
67·61	4	66·51	20	49·19	3	64·55	1
67·77	2	72·02	10	54·57	1	75·00	1
69·65	5	76·08	1	57·47	1	98·30	1
71·50	1	77·36	1	62·76	1	4116·11	1
72·71	10	85·29	2 + (Co)	68·38	1 +	23·94	1
76·80	1	88·07	4	69·60	1	42·49	1 +
78·00	1	97·86	10	71·94	1 +	50·53	1 +
78·42	1	99·66	1	72·67	2	52·45	1 +
79·36	1	3602·41	5	75·75	8	64·80	1
80·30	1	04·41	1	78·20	1	67·07	1 +
82·87	1	07·00	1	83·72	8	67·81	1 +
83·98	8	09·48	5	90·36	1	84·65	1
85·25	1	10·61	10	92·48	2	95·72	2
86·09	4	11·59	1 +	93·79	3	4200·60	2
88·43	1	12·90	6	3807·35	8	01·89	2
93·11	30	19·52	50 r	08·26	1	02·32	1
94·84	1	24·89	3 d?	12·20	1 +	31·19	2
96·47	2	30·03	1	23·68	2	36·5	1 +
96·81	1	35·10	2	24·03	1	75·26	1
99·37	1	41·75	1	31·89	5	84·84	2
3501·02	6	42·52	1	33·00	1	88·15	3
02·73	4	44·07	1	34·00	1	96·05	2
07·85	4	47·85	1	58·51	20	98·67	1
10·52	15	49·63	1 +	89·84	2	4307·51	1
11·76	1	56·71	1	3906·45	1	25·52	1
12·08	1	57·87	1	09·10	1 +	25·78	2
13·64	2 (Co)	62·10	2	12·47	1 +	30·90	1
14·10	5	64·27	4	13·14	1	31·83	3
15·21	30	64·75	1	17·25	1 +	55·30	1
16·33	2	66·16	1	42·00	1 +	56·07	3
18·80	3	68·36	1	44·29	2 +	58·0	1 +
19·97	4	69·40	3	54·7	1 +	59·76	5
23·23	1	70·60	4	62·25	1 +	67·5	1 +
23·61	3	74·30	6	70·65	2 +	68·47	2

4370.20	2	4463.60	2	4629.52	2 Co?	4762.82	2
72.35	1 +	66.54	2	31.3	1 + br	64.15	3
73.74	1 +	67.10	1	34.85	1 +	68.28	1
75.02	1	68.10	1	38.1	1 + br	73.08	1
76.04	2	70.64	10	39.8	1 + br	73.62	1
79.25	1	71.35	1	44.2	1 + br	86.47	1
80.2	1 + br	79.59	1	47.53	2	86.75	15
80.9	1 + br	80.80	2	48.85	15	87.49	1
83.0	1 + br	81.39	1	53.48	1	91.18	1
84.70	3	84.70	1	55.83	2	91.50	1
86.65	2	90.71	2	57.55	1 +	93.65	1
88.48	1	92.50	1	58.10	1 +	96.02	1
90.05	2	4501.84	1	62.77	1 +	99.65	1 +
90.55	2	06.46	1	67.12	2	4800.01	2
91.73	1	09.56	1	67.92	2	07.20	3
92.07	1	11.48	5	68.80	1	08.70	1 +
92.45	1	13.13	2	71.83	1 +	09.11	1
92.84	1	17.97	1	74.90	2	12.19	2
95.40	1 +	20.15	3	75.74	2	13.13	1 +
96.04	1 +	22.07	1	86.39	6	14.80	1
97.05	1 +	34.90	1	91.08	1	16.10	1 +
97.42	1 +	37.48	1 +	95.76	1	18.00	2 +
98.80	2	42.5	1 + br	98.60	2	21.32	2
99.78	3	47.11	3	4700.43	1 +	29.20	10
4400.42	1	47.38	3	01.70	8 v	31.37	5
01.02	2	49.81	2 (Co)	03.97	5	32.90	3
01.75	15	51.49	2	05.68	1	33.93	1 +
02.45	1	53.30	2	06.10	1	34.90	1 +
06.08	1	54.71	1	12.22	2	36.08	1
09.29	1	60.11	2	14.60	15	36.45	1 +
10.66	5 +	66.75	1 + (Co)	15.95	10	36.95	1 +
19.30	1	67.59	1	19.25	1	38.78	3
19.90	1	74.20	1 +	20.62	1	42.19	1 +
23.19	2	80.78	2	24.00	1 +	43.30	1
25.00	1 +	84.53	1	27.63	2 Mn?	45.35	1 +
31.30	1 +	88.85	1	28.02	2	52.77	2 +
31.78	1 +	90.25	1 + br	28.60	1 +	53.45	1 +
33.38	1 +	92.72	10	29.43	2	53.92	1 +
34.02	1 +	95.08	2	31.98	3	55.59	10
35.50	1	96.07	2 +	32.63	3	57.57	3
37.15	3	4600.56	8	33.40	1	64.10	2
37.78	3	05.17	10	35.00	1 +	64.49	2
41.60	1	06.38	3	36.68	1 +	66.47	8
42.58	3	10.2	1 + br	40.31	2	71.01	3
45.82	1 +	14.25	1 +	52.29	2	73.62	8
50.34	2	14.75	1 +	52.59	3	74.97	2
59.19	10	18.11	1	54.92	3	87.18	2
59.96	1	20.55	1	56.70	8	4901.15	1
62.63	8	25.88	1 +	58.60	1	04.61	10

4912·19	3	5081·29	8	5346·98	1 +	5642·10	3
14·10	3	82·52	3	47·80	1 +	42·83	1 +
18·52	3	84·20	5 +	53·60	4 (Co)	43·30	2
18·86	1	85·62	2	71·60	8 (Fe)	49·89	3
25·72	3	88·66	2	76·4	1 + br	64·23	3
30·97	1	89·10	2	77·80	1	70·18	2
34·21	1	94·50	3	78·1	1 + br	82·42	8
36·00	5	97·07	4	88·54	2	89·39	1
37·45	5 +	99·51	4	92·55	3	91·72	1
45·62	2	5100·12	8 r	5411·41	8	95·19	10
46·17	1 +	03·15	3	24·87	5	5700·44	2 Cu?
52·46	1	15·57	10	29·05	1 +	09·76	10
53·38	3	21·75	3	30·5	1 + br	12·10	5
65·31	1	25·38	8 (Fe)	36·08	8	15·29	10
67·70	1	28·20	1 +	53·00	1 +	48·58	3
71·50	3	29·55	10	53·50	2 +	49·45	1 +
76·30	1 +	30·53	2	60·70	1	54·89	8
76·50	1 +	31·93	4	62·69	5	61·03	8
80·34	10	37·23	8	68·32	2	81·00	1 +
84·31	10	39·43	4 (Fe)	69·55	1 +	82·36	4 Cu?
97·01	2	42·91	15	75·77	1 +	96·32	1
98·40	2	46·61	20	77·12	30	98·45	1 + br
5000·51	8	48·82	1	78·05	1	5805·40	15
03·92	2	55·31	3 +	81·10	2	31·82	10
10·21	3	55·90	10	83·55	2	47·20	3
11·13	3 +	58·16	2	93·53	1 +	58·00	20
12·64	4	67·63	3 (Fe)	95·15	3	64·14	1 +
14·40	3	68·81	10	99·0	1 + br	88·56	1
17·73	8	72·88	3 (Mg)	99·6	1 + br	93·11	10
18·48	5 +	76·72	8	5504·31	2	5906·70	1 +
22·77	1 +	79·30	2	10·20	6	24·23	2
26·68	1	84·78	5 +	15·00	1 +	97·02	4 +
32·92	2	86·73	2	21·62	1 +	97·80	3 +
35·52	20	88·02	1	37·31	1 +	6007·54	3
36·11	5 +	92·66	3 (Fe)	53·93	3	12·48	2
38·75	4	96·76	1	78·94	5	25·95	1 +
39·50	3	97·35	3	88·09	5	30·89	2
41·20	2	5216·58	3	89·58	4	53·91	4
42·37	5	20·30	5	91·00	1 +	86·53	20 r
48·25	2	35·61	4	92·49	8	93·37	1 +
49·00	5	43·93	1 +	93·99	8	6108·36	8
51·71	3	45·77	1 +	5600·30	4	11·22	5 +
53·45	1	48·55	1 +	07·26	1 +	16·35	20
58·18	3	49·15	1 +	15·01	6	20·02	2
68·00	2	55·52	1	25·52	8	29·19	3
68·98	2	59·72	1 +	28·55	2	30·40	6
76·50	2	65·90	2	37·33	3	34·2	1 + br
80·15	2	68·52	4	38·99	1 +	36·85	1 +
80·70	8	81·85	2	41·43	1 +	37·95	1 +

26	1 +	6224·18	8	6339·40	20	6576·55	1 + br
60	10 +	30·33	4	60·93	8	80·38	2 +
76	3	56·60	8	64·78	1	86·52	5
69	20	58·87	3	66·61	10	92·69	2 +
00	30	59·79	3 +	70·61	3	98·74	4
41	3	72·10	1	78·40	15	6635·32	3
70	1	72·95	1	84·90	8	43·89	10
25	1 +	6314·3	1 + br	6414·88	6	6767·99	5
11	1	14·89	15	21·68	10	72·55	2
00	8	16·7	1 + br	25·18	2 +	6842·3	1 +
27	1 +	18·21	1	83·08	6	6914·83	1
48	8	22·31	3	6502·53	1 +	7122·54	1
78	5	27·79	5	33·11	3		

XLVI. O. Sauerstoff.

e Messungen: Fehlen.

ial: Atmosphärische Luft.

nzahl: 0.

XLVII. Os. Osmium.

e Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. II (1895). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot).

ial: Metall von Heraeus, mit Zn legiert.

areinigungen: Pt, Ru.

nzahl: 1340.

wischen λ 3513—3902 und λ 3949—4351 auf Kupfer gemessen, auf Gaskohle.

97	1	2370·79	1	2403·95	1	2450·85	1
35	1	71·27	1	05·55	1	51·84	1
76	1	77·11	1	06·06	1 +	54·00	1
40	1 +	77·66	1	08·76	1	56·55	1
07	1 +	79·46	1	14·63	1 +	61·51	2
37	1 +	79·70	1 +	18·07	1	64·11	1 +
89	1 +	79·90	1 +	18·61	1	64·59	1 +
50	1	84·71	1	24·67	1	72·37	1
10	1	87·37	1	24·82	1	76·93	1
00	1 +	94·00	1 +	25·06	1	81·89	1
35	1 +	94·40	1	26·90	1	82·50	1
50	1	95·99	1	31·30	1	86·33	1
85	1	96·88	1 +	31·70	1	88·64	2
46	1	2401·23	1	46·00	1	91·11	1
34	1	02·31	1	46·11	1	91·76	1

2492.46	1	2589.50	1	2661.29	2	2764.05	1
93.70	1	89.59	1	62.63	1	64.15	2
98.50	2	90.87	2	66.08	1 +	65.55	1
2500.01	1	92.10	1	66.31	1 +	67.25	1
00.80	1	94.25	1	69.61	1	70.00	1
01.00	1	96.11	1	70.66	1 +	70.22	1
02.38	1	96.81	1	74.68	2	73.18	1
04.49	1	97.32	1	75.00	2	74.13	1
04.59	1	97.38	1	79.83	1 +	74.25	1
08.71	1	97.69	1	82.30	1	74.50	1
10.04	1	99.25	1	84.30	2 (Zn)	75.01	1
12.98	1	2600.03	1	88.18	1	77.01	1
13.34	1	00.56	1	89.44	1	82.69	2
15.13	1	00.86	1	89.89	3	86.41	2
18.00	1	02.43	1	92.77	1	86.90	1
18.52	1	03.30	1	94.61	1	94.10	1
19.86	1	04.70	1	94.86	1	94.30	1
26.10	1	09.30	1	97.34	1	96.84	2
27.15	1	09.67	2	99.68	2	2804.19	2
32.53	1	10.89	2	2700.82	1	07.03	3
34.25	1	11.45	1	02.50	1	09.04	2
38.10	1	12.75	2	02.92	1	13.94	2
38.17	1	13.17	2	04.55	1	14.34	2
40.25	1	16.05	1 +	06.04	1	14.98	1 +
40.85	1	20.05	2	06.80	2	15.40	1 +
42.60	1	20.75	1	07.51	1	15.90	2
43.90	1	21.50	1	08.27	1	20.30	1
46.25	1	21.95	2	09.96	1	20.66	1
47.80	1	28.56	2	14.74	2	21.37	1
54.55	1	32.99	1	15.46	2 +	24.27	1
55.20	1	34.38	1 +	15.72	1	29.40	2
55.35	1	34.55	1 +	20.15	2	32.35	1
55.90	1	37.25	3	21.97	2	37.53	2
56.17	1	38.10	1	28.36	1	38.28	2
57.87	1	41.30	1 +	32.90	2	38.74	4
58.20	1	43.74	1	40.42	1	41.70	2
62.78	1	44.23	3	40.70	1	44.51	3
64.50	1	47.00	2 Pt?	40.84	1	44.80	1
65.28	1	47.82	2	41.50	1	46.50	2
66.62	2	49.43	2	48.01	1	46.65	1
68.95	1	53.06	1	48.97	1	48.35	2
71.25	1	53.86	1	49.30	1	49.15	1
71.90	1	55.29	1 +	51.25	1	49.40	1 +
72.60	1 +	55.89	1 +	53.83	1	50.89	3
78.26	1	56.76	2	57.91	1	55.45	1
78.42	1	58.69	3	58.95	1	57.65	1
81.17	1	59.55	2 Pt?	61.21	1	60.17	1
82.06	2	59.91	2	61.54	2	61.09	3
87.56	1 +	61.05	1	63.39	2	65.80	1

2872·52	1	2962·45	2	3049·17	1	3109·79	1
74·73	1	64·21	2	49·58	2	10·75	1
75·07	2	64·75	1	50·53	2	11·20	2
77·46	2	68·55	1	51·29	1	14·92	1
78·52	2	70·80	1	52·55	1	15·13	1
84·55	1	71·10	3	55·09	1	16·59	1
86·65	1 +	72·36	1	55·33	1	18·00	1
91·00	1	75·45	1	57·03	1	18·24	1
91·98	1	77·75	2	58·80	8	18·44	2
92·47	1	78·31	1	60·44	2	20·00	1
95·19	1	78·63	1	62·31	3	20·77	1
96·19	2	79·54	1	62·59	1	24·14	1 +
2901·45	1	82·25	1	62·80	1	25·05	1 +
03·21	1	82·70	1	66·25	2	28·55	1 +
03·34	1	83·05	2	66·71	1	29·35	1
05·85	1	84·43	1 +	66·97	1	30·14	1
06·09	1	85·75	1	69·25	1	31·23	3
08·15	1	87·76	1	70·05	2	31·62	1 +
09·20	8	88·37	1	70·38	1	37·65	1
09·79	1	89·25	1	74·21	3	40·44	1
11·47	1	89·65	1	75·06	2	41·06	1
12·47	5	92·24	1	76·86	1 +	43·19	1
13·96	1	93·70	1	77·16	2	44·50	1
14·84	1	97·75	2	77·55	2	46·08	1
17·37	3	3003·62	1	77·82	4	49·93	1 +
17·94	1	07·00	1	78·20	3	52·19	2
19·94	4	08·05	1	78·48	2	52·80	3
21·20	1	10·05	1	79·67	1	53·72	3
24·64	1	12·52	1	84·72	1	55·45	1
25·41	1	13·22	3	86·40	1	56·38	8
25·69	2	15·77	1	87·86	1	56·89	3
29·62	2	17·38	3	88·37	1	57·11	1
30·32	1	18·16	4	90·21	2	57·35	2
30·69	1	19·50	3	90·42	1	59·48	1
31·42	2	20·63	2	90·62	1	60·44	1
34·75	2	29·03	1	91·38	1	60·57	2
42·32	1 +	30·83	4	93·70	2	61·55	2
42·96	2	31·13	1	94·20	1	61·86	2
48·33	4	31·41	1	99·38	1	64·75	2
49·63	3	32·94	1	3101·64	3	66·62	3
49·93	1	41·03	4	02·50	1	68·39	2
50·00	1	42·85	1	03·53	1 +	71·75	1
52·45	1	43·62	2	05·09	2	72·96	1
55·13	1	43·78	2	06·10	3	73·31	2
56·62	1	44·20	1	07·49	1	74·05	1
57·20	1	44·54	1	08·00	1	75·77	1
58·48	1	45·04	1	08·08	1	77·51	1
61·15	2	45·43	1	09·09	3	78·18	5
62·29	2	45·90	1	09·50	3	78·36	1

3179·37	1	3242·11	1	3318·01	1 +	3386·06	2
80·23	1	45·79	1 +	18·31	1 +	86·27	2
81·99	3	48·14	2 +	18·74	1 +	86·76	1
82·35	1	50·50	1	20·05	1 +	88·00	6
82·68	2	51·03	1	20·58	1 +	88·46	1
82·92	1	52·14	2	22·20	1	88·79	1
84·46	1	55·04	3	23·30	1 +	89·64	1
85·42	3	55·41	1	24·51	3	91·41	1
86·65	1 d	57·05	3	24·89	1	94·72	2 Ti?
87·08	3	59·56	1 +	26·55	1	95·85	2
87·45	2	60·43	3	26·65	1	97·90	1
89·56	3	60·70	1	27·59	4	98·71	1
91·31	1	62·44	8	29·26	1	3400·26	1
93·99	2	62·89	4	29·35	1	01·31	2
94·37	3	64·85	1	34·00	1	02·01	6
94·80	2	66·89	1	34·30	1	02·66	6
95·50	3	67·34	1	35·62	1	06·45	2
96·11	3 d	68·10	10	36·30	8	06·83	2
97·30	1	69·36	5	37·28	1	08·90	2
98·26	1	70·05	1	40·85	1	12·91	2 d?
3200·89	1	71·02	1	42·05	1	14·38	2 +
02·95	2	72·12	1	48·79	1	15·36	1
03·44	1	72·30	2	51·90	3	21·34	1
04·64	1	72·63	1	54·05	3	21·85	2
05·90	1	73·54	1	57·69	1	22·43	1
12·85	1	75·31	4	58·11	3	27·56	1
13·44	1	76·54	1	59·90	1	27·79	3
13·59	1	78·09	4	61·31	3	30·10	1
17·17	1	79·55	1	62·72	1	30·20	1
18·15	1	81·06	2	63·09	1	35·04	1
19·26	1	84·68	1	64·29	3	35·40	1
20·36	2 d	86·81	1	64·50	1	38·76	1
21·53	1 +	88·57	1	66·04	2	39·63	2
23·99	1	88·96	2	70·37	3	39·97	1
27·41	2	90·40	4	70·74	8	44·60	3
29·35	1	91·25	1	71·69	1	45·69	3
30·53	1	93·29	1	72·21	3	49·36	5
31·45	1	3301·70	10	72·70	1	50·54	1
31·56	1	05·51	1	73·21	1	53·17	1
32·19	8	06·34	3	73·35	1	55·16	2
32·67	1	09·83	1	74·35	1	56·27	1
34·34	1	11·05	4	75·28	1	58·54	4
34·81	1	12·18	1	76·80	1	59·15	2
34·86	1	13·60	1	77·10	1	62·35	1
38·30	1	14·88	1	77·75	1	65·03	1
38·75	3	15·56	2	78·80	2	65·59	3
41·18	3	15·83	2	81·81	2	69·51	1
41·56	1	16·81	2	84·16	5	74·25	1
41·94	1	17·40	1 +	84·74	2	76·98	1

1	3541.68	1	3598.25	10	3671.05	10
3	42.03	2	3602.00	4	71.60	1
3	42.85	5	02.64	2	73.01	1
3	43.43	1	02.99	1	74.67	1
3	43.85	2	04.02	1	75.60	4
3	44.70	2	04.50	1 +	78.15	2
2	46.25	1	04.65	2	78.40	1
1	48.03	1	05.97	1	81.74	3
2	48.87	1	07.54	1	84.00	1
1	49.17	1	09.30	3	84.70	2
2	49.65	2	09.83	1	85.55	1
2	49.81	2	13.50	3	87.19	1
1	50.86	1	15.77	1	87.40	1
1	51.09	1	16.73	8	88.05	1
3	54.20	1	19.59	3	89.21	5
1	54.70	1	20.40	2	90.88	2
1	55.85	2	21.26	1	92.41	1
4	56.11	2	25.53	1	92.80	1
1	58.10	1	26.05	1	93.15	1
1	58.96	1	27.39	1	94.53	1
6	59.97	10	30.12	3	95.35	1
1 Ti?	60.61	1	30.56	1	95.80	1
1	61.03	10	30.95	1	98.98	2
1	61.55	1	31.95	1	3700.45	2
2	62.51	4	35.40	1 +	01.45	1
5	64.25	2	38.20	1	01.75	2
2	67.23	1	38.72	1	02.95	2
3	68.75	1	39.44	1	03.40	4
2	69.17	1	40.50	8	06.72	4
2	69.94	4	41.40	2	09.30	5
3	71.70	1	42.65	2	12.00	2
1	72.93	1	45.28	1	12.60	1
2	74.25	3	48.45	2	12.99	2
3	77.65	1	48.94	3	13.88	4
2	80.01	1	50.52	2	14.13	2 +
1	80.68	1	53.35	2	16.38	1
5	81.95	1	53.86	3	16.48	2
1	83.21	2	54.64	5	17.00	1
3	83.55	2	54.95	1	17.54	1
10	84.56	2	56.55	1	18.06	2
3	86.65	3	57.05	10	18.49	3
2	87.48	4	57.57	1	18.87	1
8	88.11	1	60.92	1	19.64	10
4	89.48	1	61.40	2	20.27	10
1	90.28	3	66.48	4	22.11	2
1	91.77	1	68.34	1	25.45	2
1	92.49	3	69.25	1	26.13	1
1	95.96	1	69.63	1	28.52	2
1	97.66	2	69.85	1	28.85	1

3729.37	3	3781.99	1 +	3845.81	1	3922.15	2
30.88	3	82.34	20	46.55	2	25.25	2
31.95	2	82.90	1	47.07	1	26.93	2
32.99	1	83.82	2	47.71	1	27.40	1
33.50	1	85.82	1	48.94	1	28.31	1
34.70	1	85.88	1	50.11	10	28.57	2
35.36	1	86.14	1 Ti?	53.60	3	28.68	3
35.66	2	89.04	1	53.75	2 +	30.14	3
40.20	1	89.25	3	54.86	2	31.70	2
40.39	1	90.29	10	57.24	10	35.67	1
41.22	2	90.90	4	60.95	1	38.74	6
41.66	2	91.23	1	65.19	2	39.71	2
43.80	1	92.18	1	65.59	6	40.20	1
44.00	1	94.08	15	66.19	1	49.93	3
44.52	1	94.84	3	66.65	2	52.91	2
46.60	4	95.83	3	68.83	2	54.72	1 +
47.18	1	97.86	1	69.15	1	55.53	2
49.18	2	3800.06	1	73.17	1	57.80	1 +
49.99	1	00.58	3	73.86	2	60.65	3
50.72	2	00.90	1	75.26	1	63.48	1
50.95	2	01.23	1	75.82	1 +	63.80	15
51.45	2	01.40	1 +	76.91	10	65.08	3
52.06	2	01.75	2	77.45	2	69.82	4
52.69	20 d	02.77	2	78.05	1 +	74.00	1
53.99	1	04.27	1	78.65	3	75.59	3
54.65	1 +	09.80	1	80.93	2	77.39	15
56.70	1	10.59	1	82.02	4	79.53	1
56.91	1	12.45	2	84.75	1	88.32	2
57.21	3	14.20	1	85.90	2	88.76	1
58.25	1	14.42	2	86.91	2	91.66	2
60.40	2	17.78	2	88.97	1	95.10	2
64.83	1	18.21	2	91.75	1	96.99	2
66.43	4	18.80	2 Pt?	92.99	1	99.10	2
68.27	4	21.80	2	93.40	1 +	4001.50	1
69.44	1	22.06	2	94.83	1	03.64	4
70.48	1	23.47	1	95.05	1	04.18	3
71.00	1	26.78	2	95.34	2	05.29	4
71.78	2	27.30	3	97.30	1	11.14	1
72.09	2	29.20	1	99.18	1	12.60	1 Ti?
73.95	2	30.26	1	3900.54	4	15.18	2
74.30	1	31.55	1	01.16	2 + d?	18.38	3
74.55	3	32.33	2	01.87	5	20.56	1
74.77	3	36.18	10	05.65	1 Si?	33.12	1 Ga?
76.10	1	40.44	10	06.28	1	35.26	1
76.16	1	41.41	5	07.78	1	36.61	1
76.40	3	41.80	1	11.95	2	38.00	2
77.13	5	42.40	1	18.85	2	38.80	1
80.37	2	43.77	3	19.09	1	42.09	4
80.74	1	44.95	1	21.00	2	42.95	1

0	3	4158·98	3	4293·10	1	4435·88	1 +
2	1	60·15	2	94·14	10	36·49	5
9	2	60·45	2 +	96·40	3	37·25	2
0	1	61·09	1	97·56	1	37·66	1
6	1 +	70·97	1	99·87	1	39·81	3
5	2	72·71	8	4300·44	1 +	45·83	2
9	1 +	73·40	15	05·43	1	47·52	5
5	1	74·77	1	09·04	3	50·20	1 +
8	1	75·78	10	11·57	10	51·90	1 +
7	2	82·64	2	12·30	1	54·9	1 + br
5	10	84·30	3	17·72	1	58·47	1
1	4	85·18	1	18·15	1 +	59·68	1
5	2 +	86·50	1	19·50	2	59·80	2
1	2	90·07	8	26·41	4	62·48	1
8	2	92·35	2	28·84	8	66·14	1
3	4	92·80	2	33·11	1	73·23	1 +
2	1	93·06	1	38·91	3	75·00	1 +
5	1	94·37	1	42·68	2	79·99	3
8	3	95·31	2	44·80	1 +	80·49	1 +
9	1 +	4201·59	4	45·76	1	84·93	4
3	1 +	02·25	5	51·70	3	88·77	2
9	10	04·76	2	53·60	1	90·40	1 +
5	1	05·40	2	54·64	2	92·40	1 +
9	3	12·06	30	55·93	1 +	93·03	1 +
3	3	14·06	4	56·63	1 +	95·43	1
0	3	15·33	3	58·16	2 +	4500·87	1
0	2	19·02	1	58·31	2 +	11·49	1
4	2	19·84	1	64·61	1	15·06	1
2	1	26·72	2	65·85	5	19·05	2
9	2	29·51	1	70·82	3	20·02	1
9	20	32·20	1	74·65	1	20·46	2
0	1 +	33·65	4	77·00	2	25·02	3
1	1 +	37·31	1	85·03	1 +	29·87	3
3	4	41·70	2	86·49	1	37·76	2
4	1	43·32	1 +	89·95	1 +	40·07	3
5	1	47·69	1 +	91·23	3	45·93	1 +
5	1	51·40	2	93·00	1	47·20	1 +
2	5	52·73	2	95·05	8	48·85	4
0	2	61·01	30	97·45	4	50·60	10
0	2	64·91	3	4400·75	2	51·48	5
3	30	69·53	2	02·91	3	55·8	1 + br
0	4	69·78	3	04·40	2	62·76	1
3	1	70·95	2	11·28	1	66·65	1
4	1	75·10	2 +	20·64	30	70·65	1 +
0	2	77·30	2	21·32	1	73·09	1
9	2	81·54	1	25·03	1	79·20	2
9	1	84·44	1	26·44	1	91·10	1
3	2	86·05	3	28·05	1 +	95·22	3
0	1	88·13	1	32·59	3	97·33	3

4598·02	1 +	4738·57	1 +	4878·69	1	5256·00	1 +
4605·68	1	44·09	2	95·45	1	65·37	1
08·43	1	52·36	1 +	99·41	2	98·95	1 +
16·94	4	55·34	1	4912·79	2	5376·94	1
28·79	1 +	60·95	1 +	21·97	1 +	5416·54	2
31·99	4	63·30	2	36·00	1	16·85	1 +
34·92	2	81·68	1 +	43·13	1	43·49	1
38·80	1	94·20	10	79·47	1	5523·73	5
42·00	2	4800·13	1 +	5032·02	1	84·64	2
57·41	1	14·00	1 +	39·33	1	5620·26	1
63·98	4	16·17	2	73·06	1 +	45·50	1 +
69·10	1 +	26·84	1	74·94	1 +	5722·15	4
74·17	1 +	28·64	1 +	79·26	1 +	81·01	1
82·46	1 +	38·33	1 +	86·03	1	5800·80	1
86·64	1 +	44·06	2	5103·66	2	58·00	2
92·23	2	49·35	1	10·99	1	5996·30	1 +
4706·10	1 +	52·03	1 +	49·91	2	6228·00	1 +
19·15	1 +	64·15	1 +	93·70	1 +	69·6	1 + br
32·97	1	65·80	3	5202·82	3	6402·47	1 +
38·23	1 +	67·35	1				

XLVIII. P. Phosphor.

Ältere Messungen: P. Geutes, Ztsch. für wiss. Phot. 5 (1907).

Material: Phosphorsäureanhydrid, auf Kohle.

Verunreinigungen: Keine.

Linienzahl: 15.

2534·12	3	2651·28	1	2754·72	1	3280·5	2 + br
35·74	5	51·69	1	2943·75	1	3409·90	1
53·37	4	91·46	1	3039·18	2	24·75	1
55·00	3	2709·73	1	3266·6	2 + br		

Kanten.

3246·30	K. V.	3270·58	K. V.	3296·53	K. R.	3321·19	K. R.
53·54	K. R.	81·30	K. R.	3303·09	K. R.	28·45	K. R.
55·37	K. V.	86·00	K. R.	12·03	K. R.	46·42	K. R.
69·05	K. R.						

XLIX. Pb. Blei.

Ältere Messungen: H. Kayser und C. Runge, Berl. Akad. (1893).

J. M. Eder und E. Valenta, Wiener Akad. 119 IIa (1910) (Rot).

Material: Metall von C. Schuchardt, auf Gaskohle.

Verunreinigungen: Tl.

Linienzahl: 46.

2237·55	3 u	2536·7	3 + u ³⁾	2873·48	50 u	3740·20	200
47·03	5 u	77·39	20 u	2927·0	1 + br	4019·80	50
2332·72	2 + ¹⁾	2613·77	10 u	3119·2	1 + br	58·00	1000 u
89·0	2 + ¹⁾	14·26	50 u	51	2 + br	62·31	20
93·92	30 u	28·50	8	3220·75	3 + r	4168·19	10
99·70	2 +	50·5	20 + br	40·35	2 + r	4340·70	1 +
2402·06	10 u ²⁾	57·18	2	62·5	2 + r	5005·63	10
11·86	8 u	63·27	20 u	3572·95	200 u ²⁾	5201·63	5
28·80	3 +	97·8	5 + br	3639·72	500 u	5422·9	1 + br
43·92	10 u ²⁾	2802·10	100 u	71·80	100 r	5609·0	1 + br
46·30	15 u ²⁾	23·31	30 u	83·62	1000 u	6002·3	1 + br
76·51	10 u	33·21	100 u				

L. Pd. Palladium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. III (1896). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta, Wiener Akad. 119 II a (1910) (Rot).

Material: Metall von Heräus.

Verunreinigungen: Ag, Ba, Bi, Ca, Cd, Cu, Mn, Pb, Pt, Rh, Sn, Zn.

Linienzahl: 268.

2231·68	1	2362·40	2	2454·87	1	2551·95	2
51·60	1 +	68·05	2	57·35	3	61·14	1
54·40	1 +	72·24	2	57·81	2	64·2	1 + br
62·59	1	78·00	1 +	61	1 + br	65·60	3
64·40	1	88·42	1	69·34	2	69·65	2
80·92	1	2406·78	1	70·10	2	77·20	1
82·20	1	09·79	1 +	71·25	2	83·95	1
96·61	3	14·83	2	72·60	1	93·36	1
2302·14	1	18·82	2	76·50	8 u	96·09	1
16·56	1	20	2 + br	82·1	1 + br	2602·87	1
19·35	1 +	24·57	2	86·61	3	05·19	2
31·54	1	26·96	2	87·24	1	36·01	2
36·52	1	28·05	1 Au?	89·00	4	55·2	2 + br
36·66	2	31·02	2	96·78	1	58·84	2
37·84	1	33·20	2	98·87	3	76·06	2 Au?
47·62	1	35·41	2	2505·84	3	79·18	1
51·48	2	41·51	10 + br, u	13·2	1 + br	86·38	2
52·00	1	46·27	3 (Pb)	34·70	2	2734·04	2 ⁴⁾
57·70	1	46·81	1	50·76	1	42·48	2
60·58	1	48·00	8 u	51·10	1	63·19	15 u

¹⁾ Möglicherweise nur rote Komponente einer Umkehrung.

²⁾ Rote Komponente stärker.

³⁾ Die Linie ist 30 A E breit.

⁴⁾ Kommt auch im Pt und Ir vor.

2806:55	1	3396:94	3	4323:20	1 + br, v	5234:99	5
07:8	1 +	3404:73	100 u	28:20	1 + br	56:37	2
24:51	1	06:20	1	44:82	3 + v	94:36	2
39:5	1 + br	19:83	3	51:17	2 + v	95:83	30
49:90	2	21:42	50 u	58:75	1 +	5312:79	3
54:68	2	33:59	20 u	60:40	1 +	45:31	2
75:85	1	41:54	20 u	79:75	1 +	62:84	3
2922:63	10	42:13	1	86:65	2	63:45	1 +
31:59	2	42:54	2	88:79	3	95:00	1 +
80:78	1 +	60:93	50 u	4406:72	4	95:47	20
3002:74	10	81:31	50 u	21:20	2	5406:80	1
03:10	1 + Fe?	88:31	1	43:21	3	27:88	1 +
07:37	1	89:93	15	73:76	15	35:33	2
09:88	3	3507:48	1	89:63	5	65:73	2
20:79	3	17:08	100 u	97:81	2	97:07	2
21:87	3	28:86	2	4516:37	5	5529:64	4
25:99	2 ¹⁾	53:24	50 u	41:29	5	43:04	20
28:05	20	66:77	3	53:14	3 r	47:28	10
28:86	2	71:29	20 u	90:21	2	48:55	1 +
32:30	1	96:81	2	4632:81	2	62:93	1 +
46:61	1	3609:71	100 u	77:61	4	5601:88	3
65:41	20	34:85	200 u	4708:26	1 +	03:23	1
66:20	2	46:14	1	24:20	3	08:26	3
75:28	3	54:57	1	62:05	1 +	19:63	5
3109:25	2	90:49	20 u	76:74	2	21:45	1 +
14:19	30	3719:06	15	88:36	15	42:90	3
22:91	1 Au?	99:31	10	91:07	1 +	55:65	3
39:54	1	3832:45	10	4817:20	2 +	59:09	1 +
42:97	10	94:33	20	17:69	15 r	68:70	1 +
3204:14	1	3958:79	20	19:34	1 +	70:28	20
19:08	3	92:4	1 + br, r	22:46	1 +	74:55	1 +
42:83	100 u	4007:6	1 + br	36:61	2	87:77	1 +
48:13	1	20:2	1 + br	75:59	15	90:30	3
51:89	30	21	1 + br	4920:03	3	95:30	15
59:01	30	87:52	10	24:35	1	5736:81	4
86:38	1 +	99	2 + br	30:17	1	37:84	1
87:38	10	4123:79	2	72:08	2	39:89	2
3300:00	1	70:02	5	5063:55	2	60:15	1 +
02:28	30 u	4213:11	20	5110:99	4	6130:80	2
07:17	1 + Cr?	41:8	1 + br	14:57	1	71:20	1
11:15	2	46:7	1 + br	17:18	5	76:41	1
13:10	2	49:2	1 + br	27:89	1	88:25	1
21:15	2	51:65	1	61:53	1	6508:72	1
73:21	30 u	68:42	3 + v	63:99	20	6774:81	3
80:89	8	82:05	1 +	5209:05	2	84:80	20
89:20	1	4315:12	2 + v				

¹⁾ Kommt auch im Pt und Ir vor

LI. Pr. Praseodym.

Messungen: M. Bertram, Diss. Bonn (1905). J. M. Eder und Valenta, Wiener Akad. 119 II a (1910) (Rot).

al: Praseodymnitrat von Dr. C. Auer von Welsbach, auf Gaskohle.

einigungen: Ad, Ce, Eu, Nd.

zahl: 2490.

7	1	3191.55	1	3302.00	1	3386.13	1 +
6	1	96.13	1	02.80	1 +	88.15	1
8	1	96.19	1	03.33	1 +	91.04	1
8	1	99.16	1	08.45	1	94.26	1
6	1	3204.94	1	09.24	1	94.75	2
8	1	05.15	1	12.49	1 +	3401.02	1 +
5	1	07.98	1	13.06	1 +	03.70	1
6	1	11.43	1 +	14.52	1	10.15	1
0	1	12.50	1	15.10	1	14.90	1
3	1	13.75	1	20.10	1	15.84	1
0	1 +	14.53	1	24.24	1	18.53	1
0	1	19.33	1	24.68	1	19.35	1
7	1	19.62	2	25.80	1	21.25	1
0	1	24.55	1	31.76	1	27.70	1
7	1	25.10	1 +	33.56	1	30.43	2
5	1	34.86	1	34.05	1	30.65	1
4	1	35.57	1	41.07	1	31.77	1
1	2	38.99	1	41.62	1	32.20	1
2	1	40.15	1	44.07	1	33.69	1 (Cr)
0	1	45.57	1	44.67	1	34.91	1
7	1	47.61	1	50.45	1	36.77	1
0	1	49.35	1	53.66	1 +	37.75	1
1	1	49.86	1	55.80	2	38.45	1 +
5	1	57.70	1 +	58.65	1	40.26	1
6	1	58.45	1 + br	59.41	1	42.92	1
5	1	59.08	1	60.30	1	47.84	1
4	1	64.45	1	61.08	1	47.95	1 +
4	1	64.76	1	63.40	1	48.32	1
6	1	68.34	1	64.11	1	49.96	1
4	1	73.03	1	65.03	1	51.60	1
6	1	74.70	1 +	66.07	1	54.60	1 +
5	2	76.76	1	70.40	1 +	56.10	1
5	1	78.94	1	72.66	1	58.90	1
2	1	79.12	1	72.95	1	60.75	1
6	2	82.41	1	75.76	1	61.20	1
9	1	83.25	1	76.79	1	62.01	1
9	1	85.98	1	77.57	1 +	62.22	1
5	2	88.78	1 +	79.91	1	62.50	1
0	1	95.67	1	82.81	1	65.91	1
6	1	96.52	1	83.50	1	66.86	1
6	1	3300.05	1 +	83.87	1	67.15	1

3467-99	1	3552-12	1 +	3646-45	3	3711-25	2 -d
68-19	1	52-80	1 +	48-44	1	12-51	1
68-78	1	53-96	1 +	49-55	1 +	13-44	1
69-44	1	55-35	1	50-30	1	14-20	2
70-18	1	57-83	1	51-21	1	15-75	1
72-50	1	62-26	1	52-54	1	16-35	1 d
74-00	2	62-69	1	54-48	1	17-97	1
74-57	1	63-89	1	54-78	1	18-17	1 d
79-40	1	64-32	1	55-27	1	19-56	1
79-65	1 +	69-69	1	56-46	1	21-66	1
81-18	1	70-70	1	57-58	1	23-75	1 +
82-37	1 +	71-95	1	57-79	1	25-19	1
83-66	1	75-06	1	58-40	1	26-45	1
83-96	1	77-59	2	58-48	1	29-23	1
84-47	1	84-15	1	59-20	1	29-55	1
84-95	1	84-38	2	60-25	1	30-71	1 +
86-65	1	89-64	1	60-55	2	31-63	1 +
87-16	1	96-34	1	61-60	1	33-05	1
87-70	2	99-06	1	61-80	2	33-18	1 d
88-35	1	99-65	1	62-55	1 +	34-53	3
89-15	1	3600-90	2	64-79	1 +	34-90	2
91-65	1	01-16	1	67-30	1	36-64	2
92-08	1	03-32	1 +	67-85	1	39-34	3
93-30	1	05-21	2	68-99	3	39-72	1
99-19	1	06-10	1 +	70-40	1 +	41-16	1
99-25	1	08-60	1	72-08	1	44-14	1
99-69	1	11-32	1 +	74-29	1	47-42	1
3503-20	1	12-10	2	75-06	1	47-61	1
03-58	1	12-87	1	76-05	1	48-19	1
04-41	2	13-85	1 + d	77-85	1	48-63	1
04-60	1 +	15-29	1	80-14	1	48-98	1
04-95	1 +	16-78	1	82-05	1 +	50-26	1 +
08-35	1	18-20	1	85-42	1	50-61	1 +
19-26	1	21-20	1 +	86-65	1 +	51-15	2
32-85	1	21-30	1 +	87-20	3	52-45	1
33-87	1	22-52	1	87-35	3	53-54	1 +
34-65	1	27-94	1	89-55	1	54-55	1
37-44	1	29-85	1	89-85	2	55-13	1
37-60	1 +	31-12	3	90-16	1	55-24	1
38-43	1	34-58	1 +	91-77	1	56-96	1
40-16	1	35-42	2	93-65	1 +	59-75	2
42-76	1	37-76	1	94-83	1	60-24	2
45-08	1 +	38-74	1	96-79	1	61-78	1
46-13	1 +	39-92	1	98-20	1	62-03	4
46-35	1 +	41-78	2	99-65	1	62-52	1
48-16	1	43-46	1	3701-96	1	62-70	1
49-65	1	44-65	1 +	03-48	1	63-18	1
50-15	1	45-70	2	06-92	2	63-73	1
50-50	1 d	45-81	3	10-52	1	64-23	1

3764·91	2	3817·78	2	3885·33	3 d	3926·13	1
65·11	1	18·00	2	88·21	1	26·73	1
66·14	1	18·41	4	88·44	1	27·58	3
66·63	1	18·86	1	89·46	2	27·87	1
69·05	2	19·27	1 +	89·54	2	28·43	1
69·79	1	20·95	1	90·13	1	29·05	1 +
70·59	1	21·95	2	90·34	1	29·44	2
72·20	1 +	22·67	1	91·88	1 +	30·03	1
72·66	1	22·95	1	92·69	1	30·75	1
72·91	1	23·32	2 +	95·20	1	31·10	1
72·99	1	23·72	1	97·00	1 +	32·30	1 +
74·18	1	24·20	1	97·20	1	33·13	2
74·69	1	28·86	1 +	97·41	2	33·45	1
76·18	1	29·50	1 +	97·87	1	34·38	1
77·74	1	30·88	4	99·00	2	34·99	1
78·85	1	31·54	1	99·81	1 +	35·98	3
79·56	1	32·45	1	3901·85	1	38·43	2
80·40	1	33·16	1	02·61	2 d	39·02	1
80·80	2	35·05	1	04·06	1	40·30	1 + d
82·05	1	38·43	2	04·97	1	40·55	1
82·46	1	41·15	3	06·24	1	42·41	1
84·00	1 +	42·49	2	07·45	1	42·48	1
84·09	1 +	44·69	2	08·21	4	44·76	1
85·57	1	45·10	1	08·59	10	45·05	1
86·10	1	46·71	3	09·75	1	45·59	1 +
87·00	2	47·06	1	11·46	1	45·78	1 +
88·17	1	50·99	4	11·97	1	47·10	2 +
89·85	1	51·72	5	12·15	1 d	47·80	8 r
90·74	1	52·94	3	12·41	1	48·75	1
92·60	3	53·60	2	12·75	1	49·62	8 r
93·10	1 +	56·03	1	13·05	4 r, d	50·79	1 +
93·55	1 +	58·40	1	13·69	2	51·98	1
94·50	1 +	59·29	1	14·90	1	52·17	1
95·10	1	62·20	1	14·98	1	52·26	1
98·07	1	64·20	1	15·59	1	52·48	1
99·51	1	64·70	1	16·58	1	53·32	1 +
99·85	1	65·57	2	16·90	1	53·63	8 r
3800·48	4	67·68	2	17·36	1 d	55·14	1
02·45	1	68·68	1	18·06	1 d	55·35	1
04·99	2	70·50	1	19·02	5 r	55·54	1
05·65	1	70·88	1	19·74	3 r	56·67	1
06·30	1 +	73·17	1 +	20·67	3 r	56·89	2
08·30	1 +	74·61	1	21·55	1	57·80	1
09·31	2	76·34	3	22·39	1	58·65	1
10·10	1	77·39	10	23·57	1	59·55	1
11·99	2	79·35	2	23·94	1	59·63	1
13·75	1	80·61	3	24·27	2	59·90	1
14·04	1	82·01	1	25·13	1	61·45	1 +
16·21	8	82·47	1	25·65	5	62·33	1

3962·60	3 r	3998·58	1	4041·52	1	4089·65	1 +
64·42	5 r	98·74	1	42·06	1	90·16	1 +
64·97	8 r	99·26	1	45·02	8	90·91	1
65·43	6 r	99·35	1	46·49	1	92·80	1 +
65·89	1	4000·35	4 d	46·82	2	93·01	1 +
66·71	4 r, d?	00·60	2	47·28	2	95·13	2 d
67·29	1	01·06	1 +	48·31	1	96·05	1 +
67·84	1	01·62	1	49·78	1	96·52	1 +
68·30	1	03·02	1	49·99	1	97·00	4 r
70·22	1	03·37	1	51·30	3	98·57	3
71·30	4	04·89	5	52·73	2	98·83	1
71·83	2	06·83	2	53·64	1 +	4100·38	2
72·31	5 r	07·94	1	54·10	1 +	00·91	20
73·28	1	08·90	15	55·02	10 r	03·37	1
74·09	1	09·40	1	56·29	1	04·05	1
74·50	1 +	10·13	1	56·70	10 r	04·64	1
75·03	1	10·86	2 r	58·35	1	05·03	1
75·12	1	12·45	1 Nd?	58·97	3 r	05·87	1
75·84	1	13·40	1 +	59·54	1	07·26	1 +
76·46	1	13·57	1	61·53	1	07·89	2 +
76·75	1	14·50	1	62·41	1	08·49	1
77·01	1	15·52	4	63·01	15 r	09·22	1
77·30	1	16·83	1	68·25	1	09·55	1
77·60	1	16·95	1	68·98	2	10·61	1
77·98	1	19·57	1	70·45	2	11·07	1
79·45	1 +	20·00	1	71·55	1	11·97	2 +
79·81	1 +	20·46	1 +	72·17	1	12·10	2 +
80·35	1 d	21·16	3	72·70	2	12·90	1 +
81·01	1	22·36	2	73·51	1	14·01	2 + d
81·33	1 +	22·89	3 r	74·10	1	14·45	1
82·22	8 r	25·35	1	74·52	1	14·96	1
82·68	1	25·69	3	74·84	1	15·95	1 d
83·75	1 d	26·96	2	75·05	1 +	18·70	20
84·42	1	28·85	1	75·49	1	19·50	1
85·79	1	29·16	2	76·36	1	19·95	1
86·31	1	29·87	1 +	77·54	1 +	21·10	1
86·69	1	30·14	1 +	78·13	1	22·45	1
87·30	1	31·25	1 +	78·30	1 +	23·13	1
87·50	1	31·93	5	79·98	5	24·21	1
89·28	1	32·66	2	81·19	6	24·50	2
89·86	10	33·13	1	81·75	1	25·20	2
92·06	2 +	34·01	6	82·10	8 r	26·30	1 +
92·32	2	34·48	2 +	82·98	1	29·30	4
94·18	1	36·20	1	83·52	4	30·93	5
94·99	10	37·36	1	84·90	1 +	31·97	1
95·99	2	38·35	2 +	85·28	1	32·40	2 (Fe)
96·84	1	38·61	4	86·40	1 +	33·79	3
97·22	5 d	39·07	1	86·90	1 +	37·35	1
98·10	2	39·50	4	87·37	2 +	37·66	1

4138:38	1 +	4187:94	1	4245:60	1	4281:00	1 +
40:48	1 +	89:70	20 r	46:30	1	81:21	1
41:42	10	90:79	1 +	47:79	10	82:00	1 +
42:15	1	91:80	5	49:21	1	82:62	8
42:58	1	92:65	1 +	49:63	1	83:90	2 + br
43:33	20	94:05	1	50:52	3	84:64	1
44:35	1	94:35	1	51:13	1	85:60	1
46:69	3	94:76	1	51:65	3 d	86:02	1
47:26	1	95:68	1 + br	52:24	1	86:31	1
48:60	4	96:10	1	52:60	1 +	86:55	1
49:45	1	96:95	1	53:26	2	87:10	1
50:20	2	4200:67	1	55:10	1	87:61	1
51:18	1 +	01:33	2 +	55:80	1	88:62	1
51:93	1 +	01:60	2 + br	56:26	1 +	89:00	1
52:50	1 +	02:55	1 +	56:45	1	89:57	1
53:64	1 +	03:68	1 +	56:97	1	90:05	2
54:20	2	04:74	1	57:82	1	90:61	2
56:65	3	05:85	1	58:10	1	91:16	2
57:90	1	06:88	20	59:65	1	91:85	2 +
59:61	1	07:93	1	59:80	1	93:31	2
59:94	1	08:42	4	61:20	1	93:79	3
60:63	1	11:94	1	61:90	2	94:87	2 d
64:33	10	12:05	1	62:42	2	95:30	2 +
65:37	1 +	13:43	1	62:93	2	96:03	1
65:65	1 +	13:73	2	63:28	2	96:35	1
66:52	1	14:12	1	63:90	3	96:70	1
68:11	2	15:30	1	65:13	1	97:91	8
69:59	3	15:69	1	65:61	1	98:70	1
71:99	6	16:20	1 + br	65:80	1	99:11	5
72:45	8	17:35	1	66:60	1	99:84	1 +
73:88	1	17:98	3	66:86	1	4301:35	1 +
74:79	1	19:80	2 + d	67:89	2	01:75	1
75:49	2	20:29	1	68:38	1	02:28	2
75:83	2	23:18	20	68:48	1	03:30	1
76:50	1	25:50	20 r	69:25	3	03:76	3 (Nd)
77:65	1	29:95	1	70:52	1	04:82	1
78:03	1	30:77	1 +	71:91	2	05:99	20
78:83	2 +	32:49	1	72:43	8	06:67	1
79:60	20 r	32:80	1	73:08	1	06:99	1
80:55	1	33:24	3	73:40	1	07:40	1
80:86	1 +	36:30	3	74:44	1 +	07:83	2
82:50	1	36:75	1	75:33	1	08:67	1
82:80	1	37:19	1	75:45	1	09:03	1
83:10	1	38:51	1	75:95	1	09:12	1
84:42	2	39:60	1	76:34	2	10:04	1
84:75	1	40:20	2	77:36	1 +	10:42	1 +
85:31	2	41:20	15	78:22	2	11:28	2
86:05	1 +	41:40	3 +	79:15	2	11:70	1
86:58	1 +	43:63	3	80:23	8	12:11	1

4312:55	1	4341:05	1	4366:88	1 +	4397:04	2
13:42	1 +	41:53	1	67:40	2 +	98:42	2
14:01	1 +	42:26	1	68:50	10	99:45	2
14:49	1	42:8	2 +	69:20	1	99:53	2
14:90	1	42:97	2	70:05	1	4400:18	2
15:68	2	44:05	1	70:98	2	00:41	2
16:26	2	44:41	5	71:40	1	01:00	1
17:21	2 +	44:59	4	71:79	4	02:32	1 +
17:99	2	45:05	1	72:55	1	02:74	1
18:60	1	45:65	1	72:88	1 +	03:45	2
19:17	2	46:39	1	73:10	1 +	03:78	3
19:88	1	47:05	1	73:98	2	05:30	2
20:33	2 +	47:62	5	74:58	3	06:00	10
20:55	1 +	48:31	1	75:89	1	06:79	2
20:96	1	49:32	1	76:77	1	08:30	1
21:50	1	49:87	1	77:77	1	09:00	15
22:20	1	50:56	3	78:00	1	09:85	1 +
22:56	1 +	51:13	1 +	78:40	1	10:37	1
22:95	1	52:00	4	78:77	1	10:72	1
23:27	1	52:25	2 +	78:99	1	11:01	1
23:71	3	52:68	1	79:51	2	11:50	1
24:10	1	52:91	1	80:50	3	11:96	1
24:50	1 +	53:34	1	81:25	1 +	12:34	3
25:51	1 +	53:73	1 +	81:78	1 +	12:94	1
27:66	1	53:95	1 +	82:57	3	13:42	1
27:86	1	55:08	3	82:96	3 +	13:92	5
28:10	1	55:38	1	84:25	3	14:55	2
28:38	1 +	55:94	1	85:00	2	15:75	1
28:57	2	56:40	1	85:45	1	16:13	1
29:15	2	56:85	1	85:62	1	16:73	1
29:58	3	57:65	2	86:39	1	17:36	1
30:60	2 d	59:19	2	86:80	1	18:04	1
31:10	1	59:37	2	87:61	1	18:34	1
31:45	1	59:92	3	87:85	1 +	18:60	1
31:63	1 +	60:70	1 +	88:85	1	19:21	3
32:25	1	61:41	2	89:66	1	19:80	4
32:65	1 +	61:73	1	90:29	1	20:20	1
33:30	2	61:96	2	91:27	1	20:48	1
34:17	10	62:33	1	91:68	2	21:40	4 d
34:80	2	63:15	3	92:16	1 d	22:26	1
35:00	1 +	63:40	2	92:62	1	23:45	1
35:90	4	64:15	1	92:88	1	24:11	1
36:10	1 +	64:28	1 +	93:22	1	24:35	1
37:69	1	64:66	1	93:67	1	24:76	3
38:43	1	64:95	1	94:21	1	25:40	1
38:85	4	65:10	1	94:91	1	25:69	1
39:60	1	65:50	1	95:16	3	26:03	1
39:86	2	65:95	1 +	95:93	3	26:50	1
40:42	1	66:25	1 +	96:24	4	26:67	1

1	4466:18	2	4494:50	2 +	4526:63	1
1 +	66:61	1	94:9	1 + br	28:22	1 +
1 +	68:36	1	96:60	20 d?	29:10	1
30	68:81	10	97:43	1	30:11	2
1	69:20	1	98:45	1 +	31:25	2 d
1	69:82	1	98:81	1	31:75	1
1 d	70:60	1 +	99:16	1 d	32:50	1
3	70:75	1 +	99:54	1	32:95	1
1	71:60	1 +	99:67	1	33:48	1
1	71:91	1 +	99:98	1 +	33:94	1
1 +	73:10	3	4500:26	1	34:32	10 d
1 +	73:55	1 +	00:69	1	35:04	1
1 +	73:67	1 +	01:40	1	35:40	1 +
1 +	74:00	2	01:54	1	36:09	5
3	74:63	1 +	02:00	2	37:31	1 +
1	75:00	1 +	02:45	1 +	37:55	1 +
1	75:55	1 +	03:03	1 +	38:19	1 +
1	75:89	1 +	03:44	1 +	39:37	1
1	77:35	3	03:93	1 +	39:50	1
2	77:46	3	04:77	2	40:31	1
1	78:14	1	05:28	1	41:25	1
2	78:73	1	06:06	1	41:44	2
3	79:26	1	07:15	2	42:70	3
1	79:77	2	07:97	1 +	43:70	2 + d
1	80:45	1	08:55	1	44:13	1
10	80:86	1	09:11	1	44:76	1 +
4 d	81:56	2	09:55	1	45:28	1
1	82:06	1 +	10:32	15	45:48	1
3	82:90	1	11:25	1	46:05	1 +
1 +	83:24	1	11:59	1	46:47	1 +
1	83:65	2	11:97	1	46:76	1 +
2	85:05	1	12:37	1	46:84	1 +
2	85:54	1	13:40	1	48:69	3
1 +	85:70	2	13:89	1	50:01	2
1	86:15	1	14:36	1	50:23	2
1	86:75	1	16:60	1	50:83	1 +
3 (Mn)	86:98	1	17:11	1	50:95	1 +
1 + br	87:21	1	17:74	10 d	51:07	1 +
1 +	87:98	2	18:25	1	51:35	1
2	88:33	3	18:83	1 +	51:70	1
1	88:75	1	19:29	1	52:40	2
1	90:55	1 +	19:79	2	52:99	1
1	91:30	1 +	20:55	1	53:44	1 +
1	91:65	1	20:93	2	53:66	1
1	92:60	3 + d	22:30	1	54:66	1
1	93:13	2	23:38	1	54:95	1
1	93:30	2 +	24:16	1	56:13	1 +
1	93:87	2	24:52	1	56:40	1
2	94:33	2 +	24:85	1	56:84	1

4557:10	1	4586:70	1 +	4622:41	1	4658:26	2
57:59	1	87:16	1 +	22:90	1	58:55	1
58:03	1	87:25	1 +	23:35	1	58:90	2
58:65	1	88:15	1	23:82	1 +	59:66	1
59:11	1	89:30	1	24:20	1	59:90	1
59:30	1	89:90	1 +	25:45	1	60:03	1
59:65	1	90:32	1	25:75	1 + br	60:34	1
59:85	1	90:90	1	27:19	2	61:08	2
61:14	1 +	91:11	1	28:92	10 d	62:92	1
61:26	1 +	91:73	1 +	29:65	1 +	63:33	1
61:63	1	92:11	1	29:85	1 +	63:89	1
61:95	1	92:33	2	30:90	1	64:81	3
63:31	5	93:75	1	31:85	1	66:13	1
63:95	1	94:74	1	32:43	3	66:35	1
64:10	1	95:12	1	33:10	1	66:66	1
64:52	1	96:00	2 +	33:63	1 +	68:40	1 +
65:00	2 d	97:12	3	34:20	1 +	68:60	1 +
66:10	1	97:83	1	34:90	1 +	70:72	2
66:62	1	98:91	1	35:24	1	72:26	5
67:02	1	99:10	2	35:86	3	72:77	1 +
67:67	1	99:63	1 +	36:41	1	74:40	1 +
68:71	2	4600:53	2	36:90	1	74:96	2
69:80	1	01:24	1 +	39:15	1 +	75:23	1
70:28	2 +	02:71	1	39:70	3	75:65	1
70:57	1	03:65	1	40:06	1	76:35	1
70:70	2	03:97	2	40:39	2	76:90	1
71:77	2	04:37	1	42:20	1 +	77:16	1
72:29	2	04:66	1	43:68	3 d	77:96	1
73:02	1	05:16	1	45:29	1 +	78:32	2
73:46	1	05:40	1	45:66	1 +	79:22	2
74:38	1 +	06:60	2	46:24	3	79:67	1
74:81	1	07:11	1	47:16	2	80:01	1
75:06	1	08:16	1	48:12	1 +	80:50	1
76:48	3	09:3	1 + br	48:73	1	80:67	1
76:80	1	09:8	1 + br	49:28	1 +	82:25	1
77:15	1	10:37	1	49:66	1	82:40	1
77:69	1	10:8	1 + br	50:04	1	82:64	1
78:30	3 d	12:23	3	50:30	1	83:45	1 +
78:87	1	12:73	1	50:65	1	83:63	1 +
80:02	1	13:96	1	51:12	1	84:02	1
80:33	1	15:11	1	51:68	4	84:70	1
80:66	1	15:52	1	52:86	1	85:10	3 d
80:99	1 +	17:26	1	53:80	1	85:60	1
81:73	2 + br	17:76	1	53:97	1	86:44	1
82:75	1 +	17:87	1	54:21	1	87:40	1
83:85	1	18:16	1	56:15	1	87:99	3
84:60	1	18:40	1	56:95	1	88:68	1
86:10	1	19:83	1	57:40	1 +	89:20	1
86:30	1	21:50	1	57:78	1 +	89:52	1

2	4724·61	1	4761·16	1 +	4798·50	1
1	24·96	1	61·30	1 +	98·93	1
1	25·06	1	62·15	1	99·59	1
1 +	26·37	1 +	62·60	1	4800·12	2
2	26·52	1 +	62·92	3	01·28	3
1	26·68	1 +	63·75	1	01·68	1
1	28·81	3	64·63	1	02·21	1
5	29·30	1	65·41	3	02·90	1
1	30·90	3	66·10	1 +	04·1	1 + br
1 +	32·37	1 +	66·55	1 +	06·05	1 +
1	33·10	1 +	67·09	2	06·80	1 +
1	33·95	1	67·99	2	07·42	1
1	34·35	3 d	69·78	1	07·60	1 +
1	36·90	4	70·11	1	08·35	2
1	38·79	1	70·65	1	11·23	1 +
1	39·49	1	72·05	1 +	11·92	1 +
1 +	40·06	1 +	72·49	1	14·51	3
1 +	41·20	1 +	72·71	1	15·81	1
1 +	41·70	2	73·70	1	16·30	1
1 +	42·51	1	74·72	1	17·71	1
1 +	43·25	1	75·35	1	18·50	1
1 + br	43·75	1	75·60	1	19·22	1
1 +	44·36	3	76·18	1	19·90	1
1 +	45·11	3	78·35	1 +	20·29	1 +
3	46·67	1	78·47	1 +	20·79	1 +
3	47·12	3	79·38	2	21·33	1
3	47·76	1 +	80·22	1	22·13	2
3	48·36	1	82·29	1	23·16	3
1 +	48·78	1	83·05	1	24·84	1 +
1	49·91	1	83·54	4	25·65	1
1 +	50·75	1	84·80	1 +	26·00	1
3	51·50	1	85·80	1 +	26·48	1
3	51·86	1	86·78	1	26·9	1 + br
1	53·03	1	87·40	1	27·42	2
1	53·70	1 +	87·75	1	28·23	2
1	54·10	1	88·45	1	29·65	1 +
1 +	54·64	1 +	89·55	1 +	30·40	1 +
1	54·81	1 +	91·03	1	31·62	1
1 +	55·53	1	91·45	1	32·27	3
1	56·15	2	91·80	1	32·90	1 +
1	56·31	2 +	92·16	1	33·4	1 + br
1	57·29	1 +	93·10	1 +	33·9	1 + br
1	58·11	2	94·50	1 +	34·9	1 + br
1	58·23	2 +	95·08	1	35·62	1 +
1	58·7	1 + br	95·45	2	36·14	1 +
1	59·12	1 +	96·00	1 +	37·20	3
1 +	59·40	1 +	96·60	1 +	38·8	1 + br
1	60·09	1	97·02	1 +	39·5	1 + br
1	60·88	1	98·15	1	39·70	2

4840-90	2 +	4890-45	2	4951-52	3	5045-69	3
41-73	1	92-25	1 +	56-19	1 +	52-70	1
42-02	1 +	92-75	1 +	56-75	1	53-58	3
42-75	1	93-08	1 +	56-87	1	58-50	1 +
44-35	1 + br	95-10	1 +	60-44	2	59-50	1 +
45-35	1 +	96-30	2	61-23	1 +	60-60	1 +
45-80	1 +	97-45	1	64-35	1	61-10	1 +
46-15	1	98-06	1	64-74	1	61-70	1 +
46-57	1	99-62	1	65-6	1 + br	63-57	1
48-70	3 d	4900-10	1	68-05	1	65-02	1 +
50-46	1	01-67	2	68-52	1 +	67-60	1 +
50-85	1	03-56	1 +	71-14	1	70-19	1
51-65	1	04-61	1	71-40	1 +	71-43	1 +
53-87	2	07-15	3	71-73	1 +	73-80	1 +
55-50	1	07-95	1 +	72-65	1	75-85	2
56-25	1	11-65	1	75-08	2	76-50	1 +
57-54	2	12-80	2	75-90	2	76-86	1 +
58-75	2	13-30	1	76-54	2	84-62	1 +
59-18	2 d	14-20	3	77-70	1 +	85-48	1 +
60-12	1 +	14-60	1	78-51	1	87-29	2
62-18	1	14-89	1	79-26	1	88-20	1 +
62-50	1	15-59	1	80-70	1 +	91-81	1 +
62-90	1	16-54	1 +	82-18	1 +	93-31	1 +
63-30	1	17-16	1	87-90	1	95-97	1 +
64-05	1 +	19-76	1	89-43	2	96-52	1 +
65-40	2	21-93	1	91-99	1	5104-22	1 + d
66-25	1 + br	22-6	1 + br	92-50	1	10-56	4
67-57	1	24-76	3	95-8	1 + br	10-94	4
68-41	1	24-97	1	97-60	1 +	17-45	1
69-51	1	25-49	1	5000-79	1 +	18-20	1 +
70-28	1	25-78	2	02-61	2	20-73	1 +
70-56	1	27-23	1	02-90	1 +	21-9	1 + br
71-01	1	28-58	1	04-76	1	29-70	4
73-1	1 + br	29-55	1	05-71	1 +	33-59	3
73-8	1 + br	31-47	1 +	07-78	1 +	35-29	4
75-05	1 +	32-37	1 +	09-59	1	39-99	1
75-22	1 +	32-96	1	10-20	1	47-63	1
76-44	2	35-32	1	13-40	1	50-04	1
77-99	3 d	35-55	1	15-73	1	51-51	1 +
79-30	1 + d	36-15	2	18-73	2	52-41	2
79-70	1 +	38-56	1	19-90	3	52-53	1
81-15	1 +	39-07	1 +	22-68	1 +	53-40	1
82-40	2	39-90	3	27-11	3	54-66	1
83-40	1 +	40-48	3	29-16	1	56-66	2
84-49	1 +	42-50	1 +	32-16	1	59-38	1 +
84-63	1	43-90	1	33-55	2	61-91	3
86-20	2	47-36	1	34-55	3	68-49	1
87-15	1 +	48-34	1	37-61	2 +	74-10	5
89-83	1 +	50-81	1 +	44-00	2	74-95	1

5175:42	2	5290:11	1 +	5390:31	1	5458:29	1
76:00	1 +	92:10	3	91:01	1	59:20	1 +
77:54	1	92:29	3	91:47	1	60:49	2
84:04	2	92:80	3	93:19	1 +	62:61	1
88:39	1	96:10	1	94:28	1	65:50	1 +
91:52	4	96:88	1 +	96:09	1	68:00	1 +
94:61	2	97:73	1	5401:17	1	69:48	1 +
95:31	4	98:25	4	01:63	1 +	69:90	1
95:49	4	5300:30	1 +	02:80	1	70:11	2
95:65	1 +	01:95	1	03:30	1 +	70:78	1 +
96:26	1 +	04:30	1 +	05:03	1	71:45	1 +
5203:00	1 +	06:05	1 +	08:20	1 +	72:00	1 +
06:73	3	07:92	1 +	09:29	1	72:12	1 +
08:08	2	09:14	1	10:75	2 +	73:7	1 + br
12:10	1 +	10:10	1 +	11:79	3	75:81	2
12:67	1 +	11:29	2	15:40	2	77:57	1
14:54	1 +	12:50	2 d	13:62	2	77:90	1 +
15:6	1 + br	13:55	1	17:51	1	78:68	1 +
16:91	1	13:90	1 +	17:80	1	79:95	2
19:23	4	14:90	1 +	19:05	1	81:96	1
20:29	5	16:80	1	19:28	1 +	82:3	1 + br
21:50	1	21:23	2	19:91	1	83:25	1 +
23:44	1	22:01	1	21:20	1 +	85:70	1
28:16	2	22:95	5	22:69	2	86:08	1
30:43	1 +	31:66	2	23:34	1	86:82	1
36:7	1 + br	35:0	1 + br	26:59	1	87:33	1
42:8	1 + br	36:7	1 + br	27:50	1	87:65	2
43:85	1	40:39	1 +	28:21	1	87:77	1 +
46:20	1 +	41:11	1 +	29:00	1 +	89:14	1
50:00	1	41:8	1 + br	30:50	1 +	90:80	1
51:81	1	42:1	1 + br	31:39	1	91:04	1 +
51:95	1 +	42:74	1	32:33	2	91:89	1 +
54:65	1 +	44:07	2	32:85	1	92:59	2
55:92	1 +	49:00	1 +	33:86	1	92:88	1
56:8	1 + br	52:60	3	35:36	1 +	94:00	1 +
58:40	1 +	54:52	1	37:60	1	94:73	1 +
58:95	1 +	59:20	1	40:56	1	96:10	1 +
59:85	3	62:57	1 +	41:72	1 +	96:44	1 +
60:00	2 +	63:67	1 +	42:03	1 +	97:48	1 +
64:00	3	69:0	1 + br	45:64	1 +	98:55	1 +
67:79	1	72:59	1	48:65	1	5501:72	1
69:20	1 +	74:45	1	49:30	1	02:40	1
72:90	1 +	77:65	1	51:00	1 +	03:10	1 +
77:40	1 +	78:20	1 +	51:42	1 +	04:94	1
83:77	1	81:50	4	52:10	1 +	07:34	1
85:77	2	81:91	1	52:53	1 +	09:01	2
86:80	1 +	86:30	1	53:46	1	09:35	3
88:20	1 +	88:22	1 +	53:92	1 +	10:23	1 +
89:46	1	89:02	1 +	57:27	1 +	11:88	2 +

5513.82	3	5575.65	1	5643.4	1 + br	5718.05	1 +
14.76	1	76.57	1 +	43.6	1 + br	19.30	2
15.32	2	79.01	1	45.61	1	19.87	1
16.45	1	80.61	1	47.85	1	20.01	1
17.90	1 +	80.87	1	48.25	1 +	22.85	1
19.60	1	82.31	1	43.96	1 +	28.55	1
20.55	2 +	82.60	1	50.85	1	30.76	1 +
22.2	2 + br	84.25	1	51.97	1 +	32.09	2
23.01	2	88.19	1 +	53.29	1 +	39.1	1 + br
24.35	2 +	88.45	1	54.45	2	42.6	1 + br
26.10	2 +	88.71	1	56.89	1 +	45.15	1
26.76	1 +	89.70	1 +	58.76	1 +	45.7	1 + br
28.1	1 + br	90.70	1 +	60.08	2	47.30	1
28.70	1 +	91.40	1 +	61.80	2 +	48.1	1 + br, d
29.05	1 +	91.70	1 +	62.40	1	53.25	1 +
29.56	1 +	91.99	1	65.50	1 +	55.75	1 +
30.41	1	93.44	1	65.77	1 +	56.38	2
31.39	2	94.36	1 +	67.80	1 +	57.75	1
32.46	1 +	95.13	2	68.69	2 d	59.61	1
32.90	1 +	97.51	2	69.75	2	60.41	1
35.39	3	5600.46	1 +	70.21	2	61.47	1 +
37.43	1 +	01.53	1	72.09	1 +	69.40	1 +
38.58	2	05.24	1	73.19	1 +	70.00	1 +
38.95	2	05.84	3	74.33	1	73.39	1
39.95	1 +	06.90	1	75.56	1 +	75.83	1 +
40.90	1 +	08.1	1 + br	77.25	1	76.13	1 +
41.50	1 +	09.12	2	78.40	1	77.50	1 +
44.06	1	10.41	2	81.36	1	79.48	2
45.20	2	12.1	1 + br	82.10	2	85.58	2 +
45.5	1 + br	12.3	1 + br	83.90	1 +	86.42	2
48.50	2	13.25	1	84.21	1	91.65	1
49.97	1 +	17.2	1 + br	85.82	1	5801.1	1 + br
51.30	1 +	17.7	1 + br	86.70	1 +	07.79	1 +
52.09	1 +	17.9	1 + br	87.40	1 +	10.82	1
53.61	1	20.29	2	88.65	2	13.80	1 +
56.03	1 +	20.49	2	89.40	1	15.43	3
57.43	1 +	22.09	3 d	91.20	2	15.59	2
57.60	1 +	23.26	4	93.09	1 +	18.83	2
58.62	1	24.65	3	95.69	1 +	20.88	1
60.40	1	25.92	1 +	96.15	1	22.87	1
61.68	2	27.90	1 +	98.20	1 +	23.94	2 d?
62.23	2 +	32.02	1 +	5702.48	1 +	29.1	1 + br
64.47	1 +	33.25	1 +	04.64	1 +	31.19	1
65.73	1 +	35.15	1 +	07.83	2 d	35.35	1
67.10	2	36.1	1 + br	08.50	1	44.85	1 +
70.50	1 +	36.67	2	11.87	2	45.22	1
71.27	1 +	37.56	1	14.05	1	47.30	1
72.03	3	38.98	3 d	15.60	1	50.90	1
74.85	1	40.55	1	16.30	1	52.88	1

1	5996.3	1 + br	6210.78	1 +	6415.7	1 + br
1	6002.70	1	12.92	1 +	29.87	2
2	06.59	2	18.30	1 +	32.06	2
2	16.70	2	21.9	1 + br	53.65	1 +
1	18.01	3	37.06	1	55.10	1 +
1 +	25.95	3	44.60	2	62.9	1 + br
2	43.12	1	53.45	1 +	68.0	1 + br
1 + br	46.89	2	55.31	2	75.5	1 + br
2	49.52	1 +	62.82	2	78.2	1 + br
1 +	50.31	1	64.81	1 +	86.80	2
1	55.36	3	74.95	1 +	92.02	2
2	67.51	1	75.1	1 + br	97.4	1 + br
1	86.10	1	78.92	2	99.20	1 +
1 +	86.40	1	81.57	3	6500.99	1 +
1 +	87.72	2	88.25	1 +	04.37	1 +
1	90.60	1	6302.65	1	17.4	1 + br
1	93.29	1	04.30	1	19.08	1 +
1 +	96.55	1	05.52	2	40.7	1 + br
1	6106.97	1	22.57	1 + br	64.89	2
3	09.27	1 +	27.28	1 +	66.99	2
1	14.61	2	41.14	1 +	6610.17	1 +
1	22.45	1 +	44.15	1 +	16.91	2
1 +	41.75	1	47.38	2	18.63	1
2	48.46	1	51.20	1 +	31.3	1 + br
1	58.02	1 +	57.42	1 +	32.20	1 +
2	59.35	1	59.30	2	47.38	1
1 +	61.41	3	63.93	1	57.05	3
1 +	62.39	1	76.51	1 +	73.69	3
1 +	65.51	1 +	78.85	1 +	74.05	3
2	66.16	3	89.86	1 +	87.8	1 + br
1 +	82.57	2	92.3	1 + br	91.5	1 + br
1 +	87.76	1 +	93.41	2	6737.10	1 +
1 +	97.67	1	97.98	1	47.4	1 + br
2	6201.00	1	98.26	2	49.5	1 + br
1	04.39	1	6411.51	2	98.9	1 + br
1 +	05.86	1	13.97	2	6827.8	1 + br
1 +						

LII. Pt. Platin.

Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. II
 5). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta,
 Ber. Akad. 119 IIa. (1910) (Rot).

l: Metall von Heräus.

Einigungen: Ag, Au, Cu, Ir, Pd, Rh, Ru, Sn.

ahl: 461.

Ultraviolett zwischen λ 3500—3856 auf Cu aufgenommen, sonst
 hle; im Sichtbaren zwei Pt-Elektroden.

2201-10	1	2401-09	2	2616-83	1	2808-60	2
02-30	1	01-96	2	19-66	3	13-09	1
17-40	1	03-18	3	27-48	2	18-35	4
22-71	1	13-15	1	28-12	8	18-74	1
34-98	1	18-14	3	39-43	4	24-50	8 (Cu)
45-15	1	24-96	1	45-46	2	30-40	20
45-58	2	26-53	1	46-98	10	33-50	1
49-35	1	28-10	3	50-98	8	34-83	4
49-98	1	28-28	3	58-27	3	37-35	1
57-18	1	29-17	2	58-80	2	49-22	1 +
68-91	2	36-77	3	59-60	30 u	53-19	3
74-16	1	40-16	4	74-65	4	53-50	1
74-47	2	50-53	1	77-23	5	70-59	2
74-92	1	51-07	3	98-51	5	88-32	3
76-49	1	67-52	6	2702-50	20	90-51	1
76-94	1	71-10	2	05-99	20	93-38	4
80-60	1	75-22	1 Ir?	13-20	4	94-02	10
88-27	2	83-45	2	15-85	1	98-01	8
89-37	2	87-25	5	19-12	15	2906-02	6
92-47	2	88-81	2	24-46	1	08-01	2
95-81	2	90-23	3	30-01	4	10-57	1
98-45	1	95-91	3	33-78	2 1/2	12-42	8
98-86	1	98-59	3	34-07	5 1/2	12-90	1
2303-26	3	2504-15	2	34-58	3	13-39	2
05-75	1	06-03	3	37-38	2 1/2	13-69	8
08-16	2	08-59	3	37-64	1	19-47	6
11-05	2	14-00	1	38-56	3	21-52	5
15-60	2	14-17	2	44-94	1	28-21	2
18-40	2	15-13	3	47-70	4	29-90	20
26-20	2	15-68	4	53-96	4	30-90	2
31-06	1	17-26	1	55-01	5	38-91	2
40-27	3	24-41	3	57-80	1	42-88	4
43-52	3	29-50	2	58-30	1	44-89	4
46-85	1	36-06	1	66-77	1	59-22	3
47-24	1	36-57	1	69-95	3	60-90	3
56-40	2	39-31	3	71-80	5	78-17	1
57-17	3	41-45	1	72-95	2	83-87	2
57-65	2	49-56	2	73-39	4	89-93	1
68-35	3	52-33	3	73-75	2	94-90	1 r
77-36	2	72-72	1	74-10	3	98-07	30
78-05	2	74-58	1	74-30	1	3001-27	1
80-05	1	87-89	1	74-90	1	02-39	10
83-74	3	96-10	3	93-39	3	03-40	1
86-90	2	2600-00	1	93-74	1	04-28	1
89-61	2	03-23	4	94-31	2	05-91	2
96-25	2	14-70	1	2803-34	6	11-70	2 +

1) Kommt auch im Ir und Pd vor.

2) Kommt auch im Ir vor.

Pt

Bogen

1	3256·08	10	3514·85	2	3996·75	3
1	56·63	1 +	28·69	2	4002·66	1 +
5	59·29	1	31·04	1	54·94	2
2	59·87	4	46·60	2 +	66·10	2
2	61·23	2	61·90	1 +	81·64	3
3 ¹⁾	61·82	3	87·54	2	92·50	5
1	63·75	1 +	89·33	2 ¹⁾	4118·84	10
10	68·53	8	94·16	2	64·70	5
2	82·10	5	3610·95	2	92·59	4
20	83·40	4 d	11·07	1	4201·30	1
1	90·35	6	21·83	1	47·85	1
2	98·22	1 +	24·90	1	51·32	1
4	3300·10	1	28·27	10	60·13	1
4 (Cu)	02·00	10	29·00	2	63·69	2
50	02·25	5 Pd?	38·94	8	69·41	1
2	11·97	2	43·32	5	74·03	2
5	12·63	2	52·42	1 +	81·94	1 +
2	15·18	8	54·15	1	88·25	3
3	23·95	8	59·54	3	91·14	2
1	25·86	2	63·25	3	4305·68	1
3	32·33	1	68·55	1	09·35	1
4	35·94	2	72·16	6	27·24	5
4 Pd?	38·30	1	74·21	5	34·87	2
2	44·05	4	83·18	3	43·87	1 +
10	67·15	5	87·61	4	58·53	3
3	73·17	6 Pd?	3700·05	4	64·63	3
10	80·83	6	06·70	3	84·87	1
1	3406·70	2	20·90	2	91·97	5
1	08·27	15	3800·02	2	4411·60	3
2	08·77	1	00·36	2	14·45	1
1	14·61	1	00·63	3	30·41	3
1	17·20	2	18·85	3	37·48	4
1	21·87	1	20·04	4	42·75	15
1	26·87	2	91·92	3	43·36	1
1	28·09	5	98·90	3	45·73	4
10	32·00	2	3900·88	5	55·17	2
10	48·50	1 +	03·85	2	57·23	1
3	54·29	2	04·54	2	58·82	3
1	64·10	2	06·43	1	65·30	1
2	64·59	5	11·06	2	73·62	2
2	76·92	2	23·13	10	80·50	1 +
6	83·58	5	25·50	3	81·81	2
4	85·43	10	48·54	4	84·89	10 r
4 ²⁾	91·15	2	53·79	1	86·90	2 +
3	3500·45	2 +	66·51	8	88·36	1
5	05·84	1	66·69	2	89·52	1 +

mt auch im Ir und Pd vor.

mt auch im Ir vor.

Bogen

Pt, Ra

4493·33	3	4684·25	3	5095·94	1	5699·27
98·93	20 +	4722·35	1 - Zn?	5117·67	1	5762·90
4508·75	1	37·74	3	18·62	1	63·80
11·42	3	39·97	2 -	94·10	1	5840·35
14·30	2	48·07	2 -	5209·10	1	45·05
15·83	1 +	72·51	2	27·82	4	61·10
21·10	15 +	4810·67	1 +	57·70	1	5964·78
23·20	10 +	31·37	1	61·03	1	6026·28
45·85	1	32·16	1	86·39	1	77·20
48·03	5	54·09	3	5301·20	8	6172·50
52·11	2	62·60	2	19·54	1	6216·76
52·61	10	79·70	4	69·16	3	83·79
54·76	4	4980·57	1	88·10	2	6318·67
60·26	4	87·02	1	90·99	4	26·87
76·45	1	98·15	1	5469·70	1	6490·78
77·59	2	5002·84	1	75·98	8	6523·78
80·70	2	33·73	1	78·71	8	6648·71
80·81	2	38·75	1 -	5514·34	2	6710·70
4641·02	4	44·20	2	26·09	2	60·40
50·20	1 +	59·70	5	60·28	1	7258·02
58·17	5					

LIII. Ra. Radium.

Ältere Messungen: Fehlen.

Material: Radium-Baryumchlorid (70% „ Ra) auf Gaskohle.

Verunreinigungen: Keine.

Linienzahl: 50.

2709·04	2	4436·50	5	5041·74	2	5559·10
2813·85	2	44·70	1 +	81·26	2	5616·90
3649·75	3	4533·35	10	97·76	3	61·06
3814·61	50	4641·48	5	5206·17	1	5813·96
3907·53	1	82·41	100	06·47	1	5957·9
16·7	1 +	99·47	5	64·5	1	6167·30
4010·50	2	4702·13	1 +	83·49	1	6290·55
54·2	1 + Cy?	40·40	1 +	5320·50	1	6337·17
4265·27	1	4826·10	30 u	5400·46	2	6446·47
4305·25	3	56·32	5	07·03	2	87·60
40·81	20	4903·46	3 +	5502·22	1	6641·38
66·50	1	71·98	2	53·9	1 +	42·73
4426·45	1 +	82·20	2			

LIV. Rb. Rubidium.

Messungen: H. Kayser und C. Runge, Berl. Akad. (1890).
 Lehmann, Ann. d. Ph. 5 (1901) (Ultrarot). J. M. Eder und
 Valenta, Wiener Akad. 119 IIa. (1910) (Rot).
 Sal: Rubidiumchlorid von E. Merck, auf Gaskohle.
 Reinigungen: Ca, Cs, K, Na, Sr.
 Zahl: 19.

2 + u ¹)	4215·75	200 u ¹)	5579·2	1 + br, r	6071·2	2 + br, r
2 + u ¹)	5261	1 - br, r	5648·2	3 + br, r	6160·2	3 + br, r
20 u ¹)	5363·1	2 - br, r	54·3	2 + br, r	6206·70	10 + br, r
10 u ¹)	91·4	1 - br, r	5724·6	3 + br, r	98·8	20 + br, r
500 u	5431·9	2 - br, r	5858·0	1 + br		

LV. Rh. Rhodium.

Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. III
 5). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta,
 Wiener Akad. 119 IIa. (1910) (Rot).
 Sal: Im Ultraviolett, Metall von Heräus, im Sichtbaren Rhodium-
 chlorid, auf Gaskohle.
 Reinigungen: Cu, Ir, Pd, Pt.
 Zahl: 1002.

Wellen λ 3453 - 4349 auf Kupfer gemessen, sonst auf Gaskohle.

1	2359·26	1	2409·62	1	2444·35	3
1	61·25	1	10·35	1	45·70	2
1	62·01	1	12·61	1	48·36	1
1	64·74	1	15·93	2	48·92	2
1	66·97	1	18·71	2	49·15	2
1	68·38	3	19·79	2	50·67	2
1	68·94	1 +	20·26	1	55·79	1
1	69·66	1	21·05	2	56·26	1
1	70·67	1	24·02	2	59·00	2
1	79·02	1	24·51	1	61·14	2
1	83·00	2	27·20	2	62·74	1
1	83·50	2	27·77	1	63·70	2 +
1	84·76	2	29·05	1 +	69·20	1
1	86·23	3	29·60	2	70·50	1
2	96·61	1	31·94	1	71·56	1
1	99·05	1	32·03	1	72·56	1
2	2407·97	1	32·75	1	73·00	1
1	08·06	1	37·16	1	73·20	1
1	08·26	1	40·45	2	74·12	1

2474.67	1	2534.18	2	2607.83	1	2687.01	2
75.11	3	36.80	2	08.64	1	87.40	1
75.72	1	37.16	3	09.26	1	88.18	1
77.61	2	37.72	1	13.19	1	89.71	1
79.85	2	37.80	1	13.70	3	93.73	1 +
80.60	1	39.88	4	15.74	1	94.40	3
80.94	1	41.11	2	16.17	1	97.95	1
82.15	2	43.63	1	18.61	2	2700.39	1 +
83.41	2	44.30	2	21.12	2	00.69	1
85.67	1	45.44	1	22.70	3	02.17	1
87.60	3	45.79	4	24.96	1	02.33	1
88.24	1	47.75	1	25.33	1	03.84	3
88.54	1 +	48.67	2	25.51	2	05.05	1
89.98	1	51.30	1	26.00	3	05.73	3
90.85	3	53.42	5 +	26.77	2	07.32	2
91.93	1	55.00	1	28.22	1	09.60	1
92.39	2	55.45	3	30.00	1	14.50	2
93.73	1	56.98	1	30.49	3	15.14	1
94.61	3	58.76	3	33.40	2	15.40	2
99.10	1 +	60.02	1	33.50	2	16.89	2
99.81	1	60.33	1	35.07	2	17.56	2
2500.67	1	62.75	1 +	35.40	1	18.63	2
00.74	1	65.86	2	38.39	1	20.23	2
01.10	1	66.13	2	38.84	2	20.60	2
02.55	2	66.95	2	43.10	2	22.23	1
03.95	1	67.37	3	43.68	1	29.00	3
04.39	3	69.16	1	47.07	1	34.89	1
05.20	2	70.20	2	47.38	2	36.84	2
05.76	1	73.60	1 +	48.67	1	37.47	2
07.35	1 +	74.33	2 +	49.69	1	37.67	1
08.73	1 +	74.75	2	52.00	1	38.34	1
09.81	2	75.85	2	52.76	3	38.80	1
10.75	2	76.32	1	56.00	1	40.00	1
10.88	1	79.49	1	59.13	2	40.30	1
11.15	2	79.64	1	63.77	1	40.63	1
12.19	1	81.14	1	66.51	1	41.85	2
13.50	3	81.80	1	71.15	2	43.55	1
14.82	1 +	86.90	1	74.05	1	49.38	1
15.84	2	87.25	2	74.29	1	51.47	1
20.66	2	88.55	1 +	74.52	2	52.95	1
22.98	2	90.91	1	76.18	2	00.55	1
24.36	1	92.26	1	76.55	1	62.94	1
25.21	1	97.03	1	80.37	1	64.92	1
26.10	1 +	97.16	1	80.72	2	66.64	1
26.25	1	97.80	1	81.87	2	67.83	2
27.14	1	98.20	2	82.64	1	68.33	2
31.85	1	2603.51	2	83.66	1	71.63	2
32.79	2	05.80	1	84.30	1	74.56	1
33.70	1	06.55	2	86.60	2	75.86	1

2	2870.10	1	2981.25	1	3093.58	1
1	70.54	1	82.51	1	94.69	1
2	71.49	4	83.20	2	97.06	2 +
2	73.75	2	86.32	4	3102.65	2
3	74.10	1	87.11	3	05.11	2
1	78.76	3	87.56	2	08.40	1
1	80.80	1	88.47	1	15.02	3
1	80.91	2	88.97	1	21.89	4
2	81.39	2	90.07	1	23.81	4
1	82.50	3	91.87	1	24.50	2
1	84.67	1	97.45	1 +	27.00	1
2	86.10	2	3004.58	4	30.91	3
1	89.21	2	05.91	1	35.59	2 +
1	89.96	2	07.38	1	37.45	3
1	92.33	2	09.10	1	37.83	4
1	99.79	1	14.37	1	38.50	1
1	2900.07	2	19.62	3 d	45.71	1 +
1	05.07	1	19.95	1	47.74	2
2	07.33	3	20.60	1	50.40	2
2	10.30	3	24.06	3	51.50	4
2	12.74	2	25.54	1	52.73	4
1	13.70	1	27.05	1 +	55.90	5
1	14.09	2	27.82	1 +	58.06	1
3	15.52	2	28.57	3	59.35	2
3	23.23	2	35.15	1	62.40	1
2	24.15	3	45.90	2	62.84	1
2	26.94	1	46.30	1	63.55	1
1 +	29.25	3	46.87	2	67.07	1
1	32.07	3	47.26	1	71.65	1
2	36.80	1 Ir?	47.45	1 +	72.40	3
1	38.39	1	48.10	1 +	77.20	3
1	39.58	1	49.00	1 +	78.51	3
2	41.25	1	49.35	1 +	79.84	3
1	46.03	1	50.92	1 d	81.38	3
2	50.02	1 +	51.83	1	85.72	4
2	55.43	1	54.01	2	88.00	1
2	55.54	2	55.76	1	88.41	2
1	58.89	2	58.01	2	89.16	4
1	59.48	1	59.47	1	90.49	3
1	59.76	2	61.80	1	91.33	8
2	61.26	1 Cu?	67.42	3	93.96	2
1	61.78	1 +	71.15	2	94.69	3
1	63.64	2	74.82	1	97.26	5
3	65.26	2	76.75	2	99.99	1
4	68.79	4	84.10	4	3206.21	2
2	73.28	1	85.78	1	07.41	1
1	74.15	2	87.52	3	11.52	2
1	75.92	1	88.42	1	14.44	3
1	77.81	3	90.52	1	15.00	2

3218'00	3	3331'26	3	3442'87	1	3560'53	1
18'40	3	31'42	4	47'89	4	64'31	4
32'65	2	32'66	1	48'72	3	80'41	1
33'45	1	36'85	1	50'47	3	83'24	10
35'92	2	38'69	8	51'30	3	83'67	3
37'80	3	43'05	4	55'36	5	90'65	3
42'81	2	43'55	1	55'57	3	93'70	3
49'30	1	44'34	4	57'21	4	94'07	1
50'16	1	52'52	2	58'07	5	96'32	20 ¹⁾
53'47	1	53'84	2	59'36	1	97'31	20
55'10	2	54'85	3	62'19	30	98'05	2
60'97	1 +	58'00	2	69'80	4	3600'90	2
63'30	10	60'04	4	70'82	20	06'05	8
63'95	1	60'95	5	71'46	2	08'25	2
67'62	1	62'33	3	72'40	3	10'93	1 +
68'62	3	68'52	5	73'93	1	12'62	15
70'72	2	68'91	3	74'95	20	14'67	1
71'75	10	69'82	3	77'96	1	14'93	6
73'47	1	72'40	8	78'65	1	20'61	6
74'90	2	72'68	4	79'07	15	26'75	15
76'11	2	77'28	4	81'33	2	27'30	2
78'60	1	77'81	4	83'20	1	27'95	3
80'68	20 u	80'80	3	84'19	3	39'69	8
81'83	5	81'60	3	87'36	2	42'83	1
83'71	20 u	85'92	5	87'61	2	48'51	1
85'99	1	87'16	1	89'81	1	51'53	1
86'54	2	89'34	2	91'21	2	53'64	1
88'16	2	91'85	1	91'35	2	55'04	4
89'26	5	91'92	2	94'58	3	58'15	50
89'73	5	92'24	1	98'88	10	61'55	1
94'42	5	95'01	3	3500'70	1	61'77	1
96'86	4	96'95	100 u	02'67	50	62'02	5
97'41	1	99'82	10	05'55	3	66'39	15
99'06	2	3401'11	2	07'48	20	67'08	4
3300'56	6 d	04'03	1 +	08'65	2	74'92	5
01'40	1 +	06'70	4	11'69	2	81'19	8
01'80	1 +	07'38	2	11'94	3	90'88	15
02'49	1 Na?	07'87	2	13'25	3	91'50	2
03'49	1	12'43	10	19'67	2	92'51	50
04'25	2	20'32	4	25'80	3	95'10	2
05'30	3	22'43	2	28'18	30	95'65	10
07'10	1	24'49	8	38'27	4	96'24	1
07'47	1	28'52	1	38'41	5	98'40	4
08'06	2	32'24	1	42'05	5	98'76	5
09'67	1	35'03	200 u	44'13	10	99'46	2
14'67	2	40'69	3	49'70	10	3701'07	30
23'24	50 u	42'79	3	50'15	2	13'18	10

¹⁾ Kommt auch in Ru vor.

3713·60	3	3902·66	1	4211·26	30	4601·82	1
13·98	1	04·35	2	18·15	1	08·30	3
14·99	2	05·41	1	30·36	2	20·07	3
20·91	1	12·98	1	44·60	3	26·12	1 +
25·10	1	13·64	4	58·62	1 +	34·05	1 +
34·34	1	16·55	1	70·72	1	39·53	2 +
35·44	5	22·34	4	73·59	4	43·35	3
36·00	1	34·39	10	76·97	2	66·25	1 +
37·43	5	35·11	2	78·74	4	75·20	8
44·32	8	35·99	4	88·89	15	77·55	2
48·37	10	38·05	1	96·93	5	83·09	1
54·26	5	42·88	10	4308·99	1	89·60	1 +
54·44	5	44·10	2	15·14	2	96·44	1 +
55·73	3	53·20	1	36·19	1 +	4704·22	2
60·55	3	58·31	4	42·60	2	07·10	1 +
65·24	15	59·00	30	45·25	1	19·53	1 +
70·13	10	64·68	4	45·62	2	21·14	2
71·77	2	68·33	2	49·32	1	24·47	1 +
75·85	3	75·48	10	62·40	1 +	31·35	1 +
78·28	10	84·56	10	73·22	4	45·27	4
88·64	15	95·77	8	75·00	30	55·73	1
90·58	1	96·31	10	76·35	1	70·97	1
92·33	4	4023·29	6	80·11	8	71·70	1 +
93·40	15	26·09	1	88·24	1	77·35	1
99·46	20	48·56	4	4402·74	1	91·20	2
3806·08	10	49·17	3	10·45	1 +	94·35	1 +
06·91	10	53·60	3	20·17	1 +	98·83	1
09·65	3	56·50	3	21·38	1 +	4800·10	2 Ca?
12·61	4	77·74	4	23·84	1 +	01·51	1
15·18	10	80·70	2	24·23	2	03·38	1
16·62	10	81·98	2	33·50	3	10·65	4
18·34	10	82·99	15	84·00	2	13·60	1
18·90	1	84·45	2	92·65	4	17·22	1 +
22·43	15	87·94	3	4503·96	4	33·65	1 +
28·61	15	88·64	4	28·91	6	42·59	3
29·17	1	97·69	10	30·77	1	44·20	5
34·03	10	4107·65	4	44·45	2	51·82	8
34·39	6 (Fe)	16·49	4	48·89	3	61·52	3
34·89	3	19·85	8	51·83	4	61·80	1 +
44·55	1	21·86	15	57·35	2 +	65·94	3
49·14	2	25·05	2	58·90	3	88·08	1
54·81	3	29·06	20	61·08	3	98·05	1
56·15	3	35·45	20	65·37	2	4908·77	2
56·62	10	37·01	1	68·55	1	13·67	1
70·16	5	54·52	10	69·19	5	19·04	1
72·57	3	58·64	2	70·51	1 +	19·87	1
77·47	5	77·80	3	71·48	2	22·67	2
88·48	2	96·68	10	72·81	1	34·23	1
98·13	2	4206·75	3	99·6	1 +	45·00	2

4960·30	1 +	5185·18	1 +	5390·67	5	5730·65	1 +
61·10	1 +	93·29	5	5404·90	3	42·99	1
63·89	4	97·73	1 +	23·48	1	92·88	2
66·56	1	5203·50	1	24·25	5	96·00	1 +
77·93	3	07·12	2	24·90	2	5803·52	1 +
79·34	3	11·67	2	25·60	2	07·10	3
85·16	2	12·88	2	39·74	2	22·00	1 +
96·05	1	13·50	1 +	41·51	2	31·80	3
97·95	1	14·94	1	44·50	2	5907·50	1 +
5012·60	1 +	22·86	2	45·41	3	18·72	1 +
25·75	1 +	25·76	1	68·30	3	41·75	1 +
28·50	2	30·79	3	68·95	1	52·65	1 +
46·59	1	37·31	4	71·06	3	83·84	10
57·57	1	37·94	1	76·35	1	91·40	1
64·50	2	48·90	1 +	81·60	1	6102·96	2
73·63	1	51·57	2	84·44	2	16·35	1 +
85·68	2	59·41	2	92·04	1 +	28·3	1 + br
87·00	2	68·15	1	97·20	1 +	6200·20	2
90·80	4	69·46	2	5503·83	1	53·92	2
5105·68	4	69·68	2	04·87	1	76·95	1
10·13	1	80·30	2	35·26	4	77·73	1
20·83	2	92·31	3	42·25	1 +	93·65	1
30·94	1	5314·94	3	44·82	4	6319·79	3
45·17	1	28·19	1	95·10	1	32·50	1 +
55·72	3	29·92	5	99·68	10	33·25	1 +
57·29	2	31·22	2	5607·92	1	6415·00	2
58·87	3	36·85	1 +	08·55	2	6510·69	2
60·50	1 +	49·51	1	26·30	1	19·99	3
65·23	2	54·60	10	33·00	1	6628·10	1
76·14	3	56·69	2	59·84	1	30·44	2
77·44	2	79·26	5	86·60	3	6752·66	3
78·36	1 +	81·75	1 +	5702·70	1	6966·0	1 +
84·38	3	84·25	1 +	27·50	1 +		

LVI. Ru. Ruthenium.

Ältere Messungen: H. A. Rowland und R. R. Tatnall, Astroph. Journ. III (1896). H. Kayser, Berl. Akad. (1897). J. M. Eder und E. Valenta, Wiener Akad. 119 IIa. (1910) (Rot).

Material: Im Ultraviolett Metall von Heräus, im Sichtbaren Rutheniumchlorid, auf Gaskohle.

Verunreinigungen: Ca, Mg, Pd, Pt, Rh.

Linienzahl: 1948.

Zwischen λ 3507—3591, λ 3649—3898 und λ 3957—4189 auf Kupfer, sonst auf Gaskohle gemessen.

2304.95	1 +	2464.77	1	2528.80	1	2581.25	2
07.04	1 +	67.65	1	28.99	1	82.02	1
17.89	1	70.61	1	33.35	1	83.14	1
20.79	1	70.78	1	39.80	1	84.23	1
21.10	1	71.57	1	40.40	1	85.41	1
34.00	1	74.13	1	41.37	1	89.12	1
35.05	1	75.47	2	43.34	2	89.65	2
40.78	1	76.38	1	43.76	1	91.10	1
42.92	1	76.96	2	44.32	2	91.20	3
49.37	1	79.01	2	45.86	1	91.75	1
51.42	1	79.43	1	46.77	2	92.12	2
53.65	1	79.62	1	49.26	1	94.95	2
58.01	2	81.21	1	49.58	2	95.73	1
58.87	1	82.24	1 +	49.67	3	97.44	1
60.16	1	82.63	1	51.84	1	98.66	2
60.63	1	84.06	1	52.08	1	2601.56	2
60.77	1	90.00	2	52.39	1	03.90	1
70.28	1	91.85	1	52.51	1	04.41	1
73.23	1 +	93.77	1	54.06	1	05.45	2
75.39	1	94.12	1	55.75	1	05.95	2
75.74	1	94.57	1	55.96	1	07.43	1 +
87.97	1	95.76	2	56.07	1	08.00	1
92.52	1	97.75	1	56.38	1	09.18	3
93.10	1	98.51	2	57.21	1	09.56	2
93.38	1	98.66	2	57.77	1	11.14	2
96.80	1	99.86	1	58.63	2	12.17	4
97.75	1	2500.93	1	59.50	1	13.00	1
2402.80	2	01.56	1	60.36	2	14.15	2
03.24	1 +	01.98	1	60.93	2	14.67	2
03.60	1 +	02.46	1	61.90	1	15.18	2
05.25	1	07.10	2	63.24	2	17.89	2
07.99	1	08.36	2	64.50	1	18.84	1
08.36	1	08.50	1 +	64.66	1	19.11	1
11.00	1	09.16	1	65.27	1	19.75	2
14.44	1	10.23	1	66.67	1	20.71	2
20.93	1	11.05	1	68.00	1 (Al)	20.97	1
23.05	1	11.66	1	68.85	2	21.19	1
29.68	1	12.08	1	69.83	1	23.94	1
33.02	1	12.90	2	70.20	1	26.30	1
37.00	1	13.42	1	71.07	2	26.45	1
47.55	1	15.36	1	72.38	1	26.56	1
50.00	1	17.39	2	72.51	1	27.75	1
50.66	1	17.72	1	75.33	1	28.61	1
55.01	1	20.05	1	77.05	1 +	30.01	1 +
55.61	2	21.73	1	78.65	2	30.31	1
56.52	2	24.96	1	79.07	2	31.67	1
56.65	2	25.27	1	79.30	2	32.21	1
58.72	1	25.72	1	79.63	2	32.57	1
63.04	1	26.92	1	80.91	2	33.53	1

2635-94	3	2672-47	1 +	2715-31	1	2763-52	2
36-63	1	73-12	1	15-56	1	64-00	1
36-75	2	73-57	2	15-84	1	64-81	1
38-61	2	73-66	2	16-65	1	65-25	1
39-22	2	76-43	2	17-06	1	65-54	1
39-95	1	77-05	1	17-48	2	66-33	1
40-42	2	77-40	1	19-60	4	69-02	2
41-54	1 +	78-26	1	19-78	1 +	70-40	1
42-07	1 +	78-86	5	21-65	2	70-81	1
43-05	4	79-85	1	22-50	1	72-58	1
44-70	1	83-79	1	22-76	2	72-71	1
46-09	2	84-19	1	22-88	1	73-07	1
46-71	1	85-25	1	24-15	2	74-59	1
47-40	2	86-40	4	25-55	3	75-28	1
48-03	1	87-22	2	27-05	1	75-73	1
48-55	2	87-60	2	28-90	2	76-00	1
48-86	2	88-23	1	29-54	2	76-50	1
49-61	2	88-67	1	30-40	2	77-62	1
50-09	1	89-00	1	31-02	2	78-50	3
50-52	1	89-99	2	32-00	1	79-07	1
50-70	1	90-51	1	33-18	1	80-87	1
51-40	2	90-94	1 +	34-45	4	82-31	1
51-62	1	92-29	5	35-82	5	84-63	1
51-95	3	92-95	1	36-40	1	85-05	1
53-25	1	93-42	1	36-93	1	85-75	2
53-80	1	93-76	1	37-54	1	87-92	3
54-42	1	96-65	1	37-88	1	92-43	1
54-55	1 +	97-60	1	38-98	1	92-75	1
54-93	1	99-95	2	39-30	3	96-66	1
55-24	1	2700-57	1	40-34	1	96-80	1
55-32	1	00-75	1	44-00	2	98-11	1
56-32	1	01-43	2	44-11	1	2801-99	1
56-65	1	02-52	1 Pt?	44-54	2	03-61	1
56-76	1	02-92	2	45-15	1	06-86	1
57-24	1	03-40	1	45-20	1	08-34	1
58-47	2	03-87	1	45-90	1	10-14	3
58-87	1	05-41	1	46-16	1	10-69	8 d
59-69	4	07-55	1	48-09	2	11-35	1
60-67	1	08-05	2	50-44	1	12-93	1
61-25	1	08-72	1	52-37	1	13-79	1
61-68	4	08-92	1	52-55	2	14-97	1
61-93	1	09-29	2	52-86	2	17-20	2
64-88	2	10-34	1	53-54	2	18-46	3
65-83	1	10-83	1	54-70	1	18-92	1
67-50	1	12-20	1	57-17	1	19-05	2
68-05	2	12-52	3	57-92	1	21-30	1
68-44	1	12-96	1	60-28	1	22-15	2
70-59	1 +	13-29	2	62-41	2	22-66	1
70-83	1 +	13-81	1	63-25	2	24-90	1

1	2877-20	1	2919-72	3	2965-67	3
3	77-93	1	20-37	1	65-80	2
3	79-46	1	21-06	1	66-69	1
1	79-86	3	21-28	1 +	67-46	1
1	80-35	1	23-95	1 +	68-57	2
2	81-40	2	24-77	1	69-08	2
1	82-23	2	25-20	1	71-90	1
2	82-71	1	27-24	2	74-11	2
1	83-71	3	27-65	2	74-46	2
1	84-62	2	28-60	1	75-25	1
3	84-96	1	29-55	1	76-70	3
2	86-63	4	30-02	1	77-04	3
1	87-24	1	33-35	1 +	77-35	2
1	87-39	1	34-29	1	77-60	1
2	88-10	2	36-12	1	78-47	1
1	88-74	1	36-35	1 +	78-75	2
2	91-01	1	37-45	1	79-83	3
1	91-25	1	37-65	1 +	80-05	3
1	91-75	2	39-25	1	82-05	2
2	92-64	3	39-80	1	85-95	1
1	93-85	1	40-06	2	86-45	1
1	95-93	1	40-47	2	87-81	1
1	96-64	2	42-36	1	88-20	1
3	97-82	1	43-57	1	89-06	1
1	98-64	2	44-03	2	89-44	5
1	98-78	1	44-14	1	90-43	1
1	99-84	1	44-26	1	92-25	2
1	2901-90	1	45-79	1	92-25	1
1	02-05	3	45-89	3	93-09	1
1	02-20	3	47-10	2	93-39	3
3	02-97	1	49-60	3	95-07	4
1	03-18	1	50-10	3	96-04	1
3	04-30	1 +	50-65	1 +	97-02	2
1	04-84	1	51-54	1	97-54	2
1	05-76	3	52-63	1	97-73	2
1	05-93	3	53-12	2	98-45	3
1	06-43	2	54-60	1 +	99-00	3
3	09-03	3	55-48	3	3000-34	1
1	09-34	1	55-70	2	01-75	1
2	10-54	1	55-96	1	02-17	2
2	10-90	1	56-23	1	03-60	1 +
1	12-55	1	58-13	1 +	04-34	1
1	12-87	1	59-85	2	04-73	1
1	13-28	2	61-11	2	06-09	1
2	14-41	2	61-81	1	06-70	5
1	15-74	1	63-54	2	08-36	2
1	16-37	10	63-84	2	08-90	2
10	17-24	1	64-42	2	09-80	1
1	17-85	2	65-30	1	10-60	1
				3	13-04	2

3013·47	2	3080·31	2	3129·72	2	3185·56	1
17·36	4	81·01	3	29·94	3	86·16	5
19·45	2	83·26	2	33·00	3	88·06	2
20·62	3	84·65	2	33·82	1	88·46	3
20·99	3	85·59	1	36·05	1 +	88·73	2
25·23	1	86·19	3	36·50	1 +	89·03	2
27·17	1	86·63	1	36·70	4	89·41	2
27·89	1	87·04	1	37·05	1 +	89·84	2
30·89	2	88·16	1	38·89	1	90·10	4
32·02	1	88·30	1	39·40	1	91·91	1
33·55	3	89·26	4	40·23	1	92·20	3
34·15	2	89·92	3	40·62	2	93·65	2
35·58	2	90·35	3	41·10	4	94·87	2
36·57	2	91·01	1	43·77	1	95·46	1
37·85	2	92·01	3	44·39	3	97·74	4
38·07	2	94·02	1	44·81	1 +	98·44	2
38·29	3	94·51	2	46·18	1	99·25	1
39·78	1	94·62	1	47·32	2	3201·36	1
40·06	2	96·68	8	48·60	2	01·63	3
40·43	3	97·35	2	50·30	1 +	02·70	2
42·03	1	97·71	3	50·82	3	04·17	3
42·60	3	98·97	1 +	51·50	1	05·42	3
42·93	2	99·41	6	53·95	3	08·40	1 +
45·83	4	3100·95	8	54·55	2	08·50	1 +
46·09	1	04·57	1	56·96	1	08·86	1 +
46·34	2	04·72	1	57·55	2	09·75	2
48·60	2	05·39	2	57·78	1	10·30	2
48·89	3	05·51	2	59·01	3 Ca?	13·10	3
50·30	1	06·95	2	60·03	4	14·49	1
51·71	1	07·83	3	63·97	1	16·67	3
52·45	1	08·53	1	65·08	1	20·23	2
55·04	3	09·50	1	65·31	1	21·34	2
56·18	2	10·65	3	67·53	1 +	23·42	5
56·96	1	12·03	3	68·35	2	24·77	2
57·46	2	12·41	1	68·63	5	26·50	4
58·77	2 Os?	12·79	2	70·21	2	27·02	2
58·90	2	13·50	2	71·39	1	28·00	3
59·27	2	16·92	1	73·25	2	28·28	2
60·35	1	18·16	2	73·53	2	28·64	3
62·17	1	18·79	2	74·25	3	29·91	2
64·98	10	19·60	1	75·44	1	30·75	2
68·38	2	20·66	1	76·41	3	32·89	2
69·30	1	22·15	1	77·16	3	34·64	1 +
71·60	1	24·29	3	78·85	1	34·95	2
73·45	3	24·49	2	79·42	3	35·23	1
75·40	1 +	24·73	2	80·56	1	36·10	1
76·88	2	26·08	4	81·35	1 (Ca)	38·65	4
77·17	2	26·75	1	81·41	1	38·87	2
77·65	2	28·55	1	85·00	2	39·75	4

3241·37	4	3291·80	1	3336·76	2	3381·06	2
42·30	1	92·40	2	37·95	3	85·30	3
42·96	2	94·26	10	38·85	2	85·62	2
43·64	4	94·90	1 +	39·69	10	85·85	2
44·47	1	96·25	3	39·90	2 +	86·38	2
44·59	1	96·79	3	41·23	2	87·37	2
44·71	1	97·39	2	41·36	1	88·84	3
48·97	1	98·10	3	41·81	4	89·65	3
50·12	3 d	98·56	2	42·85	1	91·06	1
51·47	2	99·47	2	44·67	3	92·05	2
52·04	2	99·93	1	44·94	1	92·67	5
52·42	1 +	3301·73	8	45·45	2	99·51	2
52·70	1	02·05	2	47·75	2	3400·12	1
53·06	1	02·26	1 Pd?	48·15	2	00·75	1
53·13	1	04·14	3	48·83	2	00·90	1
54·67	3	04·65	1	50·25	2 +	01·65	2
54·83	3	04·79	1	50·69	1	01·90	5
55·35	1	04·95	2	52·08	2	03·94	1
56·46	2	05·30	5	53·15	1	05·38	1
58·17	2	07·68	1	53·45	2	05·41	1
59·10	1 +	08·11	2	53·79	2	06·03	2
59·81	3	08·76	1	53·97	1 +	06·73	2
60·31	2	09·97	1	54·77	1	07·05	1
60·48	5	10·22	1	55·80	2	09·42	8
61·26	2	11·08	2	56·34	2	09·70	2
64·00	2	12·35	1	56·60	1	11·77	5
64·70	3	14·20	1	58·77	1	12·22	1
64·80	3	14·90	2	59·23	5	12·95	2
66·60	3	15·17	3	61·31	2	13·86	1
67·25	1	15·36	3	62·14	3	14·12	1
68·34	5	15·58	2	62·47	1	14·43	1
69·10	1	16·52	8	64·24	2	14·78	2
70·40	1	17·03	1	64·95	1	16·32	2
72·38	1	18·01	3	68·59	8	17·50	20
73·22	4	19·00	5	69·42	1	17·79	1
73·77	1 +	19·65	1	69·80	2	18·11	1
74·83	4	19·95	1	71·60	1	19·38	2
77·50	1	20·93	1	72·00	3	20·24	3
77·70	3	21·39	1	72·93	1	22·59	1
79·52	1	22·40	1	74·13	2	26·09	2
80·61	3	24·06	1 +	74·78	3	26·57	1
81·74	1	25·13	3	75·04	2	28·50	20 u
82·00	2	25·38	3 +	75·38	1	28·80	4
82·75	1	26·25	1 +	76·20	1	29·72	4
85·07	3	27·83	3	78·16	3	30·56	1
85·50	1	28·58	1	79·18	1	30·91	5
86·05	1	32·20	3	79·40	2	32·36	2
89·37	1 +	32·77	2	79·75	3	32·52	2 +
91·27	1	35·82	5	80·32	3	32·91	5

3433-40	3	3502-58	3	3554-04	3	3599-54	1
35-34	3	02-65	1 Rh?	54-43	1	99-91	5
36-47	2	09-86	2	54-80	1	3601-64	2
36-87	30 u, r	11-30	1	55-98	1	05-80	3
38-51	5	11-74	1	56-30	1	06-30	1
39-81	2	13-06	1	56-55	1	08-87	2
40-35	3	14-29	1	56-80	3	09-25	2
43-30	2	14-65	3	57-22	3	14-01	1
45-45	1	14-91	2	59-79	1	14-50	1
46-10	1 +	15-85	1	60-01	1	17-10	3
46-23	2	16-05	1	60-15	1	19-34	4
46-62	2	16-35	1	60-32	1	20-45	3
49-11	5	17-55	1	61-72	1	23-81	3
53-06	3	19-14	2	62-05	2	24-07	1
55-53	1	19-80	4	62-76	2	25-33	4
55-88	1	20-29	4	63-30	1	26-89	4
56-76	3	22-14	1	63-75	1	27-44	2
57-84	1	22-44	1	63-97	1	31-86	3
59-74	2	25-04	1	64-30	1	32-56	1
62-11	2	25-78	1	64-51	2	34-08	3
63-30	3	25-95	1	64-71	2	35-09	10
65-47	1	26-70	1	64-96	2	35-66	3
67-19	2	28-84	5	67-29	3	37-62	5
72-41	3	31-55	4	67-88	1	38-16	2
72-86	2	31-96	1	68-62	1	40-78	4
73-91	5	32-96	4	70-75	8	45-82	1
75-00	2 Rh?	35-20	1	71-91	2	46-25	5
80-30	1	35-52	3	72-19	3	48-54	1
81-05	1	35-99	3	73-83	1	49-35	1
81-45	5	36-71	2	74-30	1	50-48	5
82-50	2	38-10	5	74-75	1	52-48	2
83-32	4	39-42	3	75-20	1	52-65	1
83-45	4	39-52	4	77-02	1	52-83	1
86-35	2	40-37	1	77-68	1	53-85	1
86-95	2	41-20	1 Fe?	78-84	1	54-55	3
89-88	1	41-79	3	79-92	3	57-32	2
90-88	1	45-93	1 +	82-96	1	57-74	1
92-25	1	46-15	1	83-25	1 Rh?	59-62	1
93-37	1	47-12	1	84-32	3	60-97	2
94-40	3	47-33	1	85-96	1	61-51	6
96-13	3	47-53	1	87-35	8	61-72	3
96-29	2	49-82	1	89-38	5	63-52	5
98-03	1	49-90	1	90-69	1	67-16	1
98-09	2	50-43	3	91-05	2	68-14	1
99-09	50 u	50-80	2	93-18	20	68-88	1
3500-67	1	51-40	1	96-31	20 1)	69-70	5
01-53	2	53-85	1 +	98-64	1	71-37	2

1) Kommt auch im Rh vor.

3672·20	1 +	3733·18	2	3803·31	3	3860·84	3
72·54	2	35·15	1	05·56	2	61·57	1 +
75·41	2	37·53	3	05·80	1	62·80	8
76·80	2	37·90	1	08·82	4	64·96	1
77·10	2	38·78	2	12·89	4	65·51	3
78·14	1	39·05	3	13·34	1	67·30	1
78·22	1	39·60	4	15·00	3	67·97	8
78·47	3	41·37	1 Cu?	17·44	5	71·35	2
80·25	1	42·44	10	18·06	2	73·69	4
83·73	1	42·95	4	18·50	1	76·21	3
84·81	1 Cu?	44·10	1	19·17	4	76·80	2
85·22	1	44·35	2	19·90	2	80·97	2
86·10	2	44·56	4	20·55	2	82·15	3
86·75	1	46·36	1	21·81	1	84·20	3
90·19	1	52·01	2	22·22	4	84·83	3
93·75	2	52·95	2	25·07	4	87·95	3
96·74	3	53·70	5	26·24	2	90·35	3
97·92	2	55·24	3	28·86	3	91·58	2
98·02	1	55·86	2	29·45	2	92·40	5
3700·50	2 +	56·09	5	29·60	1	92·92	2
01·15	3 +	59·98	3	31·03	2	94·39	2
01·47	1	60·18	4	31·94	5	97·40	3
01·99	1	61·63	4	35·20	4	97·84	1
02·36	2	63·71	1	36·10	1	98 50	3
03·07	1	64·19	2	36·81	2	3901·42	4
03·35	2	65·95	1	38·20	4	06·14	1
05·50	2	66·63	1	38·82	2	08·90	3
09·23	1	67·51	5	39·81	6	09·22	8
10·45	1	70·61	1	40·91	3	11·30	2
12·45	3	71·22	1	41·12	3	12·26	3
14·80	1	72·03	1 + Cu?	42·76	2	15·00	4
15·70	2	73·32	1	43·22	3	21·08	5
16·32	2	77·72	3	46·80	4	22·48	1
17·14	4	77·89	3	47·33	1	23·62	10
17·81	1	78·83	3	47·59	1	24·76	2
18·45	1	79·56	1	49·05	1	26·06	10
19·48	3	80·12	2	49·55	1	26·60	1
20·90	1	81·32	3	50·53	5	31·95	10
22·45	1	81·83	1	52·21	3	32·45	1 +
25·12	3	82·88	2	52·67	1	35·50	1
25·61	1	84·90	1	52·94	1	36·94	1
26·24	3 +	86·18	10	54·80	2	38·05	4
27·06	10 u	90·64	10 +	55·68	1	39·25	1
28·16	10 + u	94·46	1	56·54	3	41·81	3
30·59	4	95·33	3	57·05	2	42·22	3
30·74	4	98·20	3	57·63	5	44·33	3
31·10	1	99·00	8 +	58·79	2	45·73	10
32·20	2	99·55	8 +	59·80	2	46·45	2
32·90	1	3800·41	2	60·57	1	49·55	3 r

3950·18	3	4049·58	3	4135·01	1	4248·28	2
50·38	3	51·56	5	37·39	3	54·51	1
50·57	4	52·36	4	44·32	10	55·55	1
51·35	3	54·23	5	44·94	1	55·86	1
52·47	1	54·86	1	45·92	8	56·78	1
52·85	5	59·02	1	46·91	8	59·15	4
54·04	1	59·60	1	48·53	3	60·16	3
57·37	1 +	63·14	2	50·49	3	63·54	2
57·60	2	64·26	2	56·46	1	65·75	2
65·06	5	64·61	4	57·98	1	73·12	1
69·95	2	66·46	1	58·50	1 +	77·41	2
74·66	3	67·79	4	59·37	2	78·84	2
76·60	6	68·54	5	61·82	4	82·10	2
79·60	5	71·55	3	64·60	1	82·36	2
82·05	2	73·16	4	67·04	3	84·51	5
82·40	1 +	76·15	1	67·66	5	87·21	4
85·01	10	76·89	8	68·94	1	90·70	1
87·95	6	79·45	2	70·22	3	92·42	1
89·35	2	79·98	1 +	70·77	1	93·44	4
94·72	1	80·78	20	71·80	1	94·97	4
96·13	6	82·96	3	72·60	1	96·09	5
96·66	2	84·06	1	75·60	3	96·84	2
4005·80	4	85·58	5	82·62	3	97·88	10
06·74	4	88·55	1	82·82	2	4301·30	1
07·67	3	91·24	3	83·01	2	08·56	1
08·42	4	93·95	1	85·65	1	09·36	2
11·89	1	97·21	3	89·64	2	12·65	1
13·65	3	97·97	10	97·05	3	14·49	4
13·88	2	4100·53	3	97·75	4	16·79	3
14·30	2	01·41	1	99·06	4	18·59	3
16·90	1	01·90	4	4200·07	10	19·26	1
19·71	2	02·45	3	06·19	5	20·05	5
21·16	3	03·80	1 +	07·80	3	20·74	1
22·33	4	06·08	2	12·24	10	20·99	1
24·00	3	07·98	2	14·61	5	21·45	1
24·48	1	08·20	2	17·45	5	23·14	1
24·86	2	09·80	2	20·84	4	25·25	4
26·65	1	12·92	8	25·25	3	27·00	4
28·59	2	13·55	4	29·49	3	27·49	1
30·30	1	14·30	2	30·49	5	27·57	3
31·16	3	18·66	3	32·48	3	28·71	1
32·36	3	21·13	5	36·84	3	31·31	3
33·65	2	23·00	1	39·80	1	32·65	2
36·60	1	23·23	4	40·20	1	36·57	2
37·87	2	23·98	3	41·23	5	37·43	3
39·37	5	26·57	1	43·22	5	38·82	2
40·62	2	27·60	3	45·00	3	40·50	2
42·13	1	28·00	3	46·50	4 d	41·20	2
47·10	2 +	31·40	1	46·89	4	42·24	5

8	1	4490.42	3	4653.94	1	4815.73	5
4	4	91.88	2	54.50	4	17.51	2
8	4	98.32	5	56.60	1	22.73	1
2	5	4508.20	1	62.67	1 +	26.36	1
7	3	08.74	2	69.32	1	26.73	1
8	3	10.25	3	70.15	3	28.85	1
0	2	11.36	3	74.81	3	33.18	3
9	1	16.44	1	81.97	5	38.30	1
0	1	17.05	4	84.19	4	39.18	3
9	2	17.99	4	85.96	1	39.91	1
7	2	21.12	3	90.29	4	41.90	1
8	10	31.04	3	4709.68	10	43.90	1
4	2	42.60	1	12.20	1	44.72	3
5	3	43.85	2	16.20	1	48.02	1
5	4	47.10	1	21.11	1	48.31	1
1	4	47.46	4	31.51	3	52.03	1
2	3	48.01	3	33.67	3	53.66	1
15	1	49.59	1	37.06	1 +	54.71	2
60	5	50.11	3	38.61	1	60.60	1
20	3	52.30	3	43.21	2	62.02	3
14	2	54.69	10 u	51.18	1	63.26	1
87	1	60.16	3	52.30	1	65.25	2
96	4	62.77	1	53.26	1 +	69.32	5
75	2	64.87	2	56.40	3	69.96	1
21	8	80.24	3	58.03	6	74.50	2
46	1	84.63	10	61.73	1	75.20	2
03	3	87.29	2 Cu?	62.56	1	77.59	1
63	4	89.75	1 +	62.77	1	82.83	1
15	3	91.32	3	64.59	2	85.20	1
99	2	91.75	1	67.34	1	88.80	1
19	1	92.72	4	69.50	3	95.53	2
68	5	96.90	2	73.34	2	95.75	3
49	1	99.27	4	74.19	2	99.41	2
52	1	4601.95	2	81.29	1	4901.24	1
60	1	05.85	2	81.94	1	02.02	1
95	8	12.52	1	83.51	1	03.23	4
470	3	17.83	1	84.45	3	04.75	1
953	5	26.20	1	87.54	1	05.19	2
022	10	28.50	1 +	94.56	3	08.07	3
569	1	35.86	4	95.74	3	10.40	1
653	1	38.60	1	98.60	3	11.75	1
745	2	39.51	1	4801.35	1	13.46	1
121	1	41.15	1 +	03.07	1	14.35	1
411	4	42.76	1	05.09	3	21.22	3
550	1	45.27	4	06.40	1	34.26	3
959	2	47.00	1	09.90	1	35.80	1
060	4	47.79	5	12.43	1 +	37.40	1
220	2	48.28	1	13.42	1	38.59	3
857	3	52.35	1 +	14.89	1	44.18	1

4955.43	3	5134.08	1	5350.76	1	hr
60.05	2	34.30	1	59.80	1	
67.80	1 +	36.73	4	61.99	4	
68.15	1 +	42.93	3	62.25	1	
69.08	3	47.41	3	65.82	1	
74.26	2	51.22	3	73.50	1	
75.54	1	53.35	1	78.02	3	
76.36	3	55.31	3	86.09	2	
78.15	1	60.16	1	5401.22	3	
80.51	3	65.2	1 hr	01.60	2	
83.65	2	71.23	8	19.06	2	
87.45	2	95.16	3	27.81	2	
92.92	3	5200.03	2	39.41	1	
5003.71	1	02.26	1	39.60	1	
05.44	1	09.65	1	52.92	1	
10.77	1	13.60	2	55.00	3	
11.40	3	14.24	1	56.30	3	
15.11	2	23.70	2	73.05	1	
19.15	1	35.75	1 +	75.36	1	
20.45	1 +	42.55	1 +	79.60	3	
26.36	2	43.12	1 +	80.49	2	
28.34	1	45.60	1 +	84.51	3	
39.78	1	51.82	2	84.82	1	
40.50	1	57.27	2	96.91	1	
40.91	1	64.12	1 +	5501.24	1	
41.52	1 +	66.65	1	10.94	3	
45.55	1 +	67.00	1	12.61	1	
47.47	1	69.72	2 (Fe)	18.05	1	
53.16	1	75.27	1 +	22.00	1	
57.51	8	81.01	1	31.20	1	
62.83	1	84.25	3	40.85	1	
73.15	2	91.35	2	49.95	1	
76.30	1	99.05	3	50.05	1	

LVII. S. Schwefel.

Ältere Messungen: Fehlen.
 Material: Schwefel auf Kohle.
 Linienzahl: 0.

LVIII. Sa. Samarium.

Ältere Messungen: Ch. Rütten, Ztsch. für wiss. Phot. 3 (1905)
 J. M. Eder und E. Valenta, Wiener Ber. 119 IIa. (1910) (Rot).
 Material: Samariumnitrat aus Oxid von Demarcay, auf Gaskohle.
 Verunreinigungen: La.
 Linienzahl: 1679.

2788.50	1 +	3143.55	1 +	3228.63	1	3272.63	1
96.80	1 +	45.96	1	28.92	1	72.71	1
2809.57	1	47.33	1	30.69	2	72.95	2
10.96	1	52.25	1	31.66	2	73.62	2
31.06	1	52.65	2	32.07	1	75.99	1
66.18	1	62.28	1	32.76	1	76.85	2
68.51	1	62.44	1	33.80	2	81.00	2
91.43	1 +	70.00	2	34.55	1	85.79	2
2910.40	1	70.33	1	36.75	2	86.35	2
3034.96	1	78.25	1	37.30	1	86.67	1
39.20	1	84.03	2	38.02	1	90.50	2 d
47.03	1	86.15	1	39.77	2	90.70	1
50.90	1 +	86.40	1	41.30	2	93.51	2
51.12	1 +	87.12	2	41.71	1	95.60	2
61.67	1	87.35	2	42.17	1	95.96	2
65.31	1	87.89	2	44.81	1	98.25	2
65.88	1	88.84	1	45.89	1	3301.12	1
66.15	1	93.15	2	47.00	1	01.83	2
67.80	1	96.22	2	48.25	1	02.84	1

Bogen

Sa

3321.35	3	3397.90	1	3480.73	1	3582.80
23.95	2	3400.00	1	82.85	1	83.52
25.40	2	02.60	3	87.55	1	84.40
25.63	2	03.23	1	92.77	1 +	87.60
28.05	2	08.79	3	92.92	1 +	91.90
29.75	1	11.43	1	93.75	1	92.78
32.86	1	14.05	1	96.05	1	93.56
33.80	1	15.10	1	3500.00	2	93.88
35.19	1	18.26	2	00.65	2	98.07
36.25	1	18.64	2	01.40	1	3601.84
40.75	3	19.88	2	03.44	1	02.15
41.58	1	20.65	1	04.35	1	04.42
43.64	2	22.33	1	07.00	1	05.13
43.78	2	24.90	1	07.23	1	09.63
44.50	2	25.38	1	09.27	1	12.58
46.50	1	26.34	1	11.39	2	13.72
47.05	1	28.13	1	11.76	1	15.37
47.45	1	29.90	1	12.82	1	20.25
48.81	2	32.29	1	13.10	1	20.74
51.05	2	33.85	1	13.20	1	21.35
51.43	1	35.40	1	18.20	1	22.65
54.38	1	37.23	2	18.46	1	23.50
54.43	1	37.77	1 +	23.25	1	26.65
54.86	1	38.19	2	24.71	1	27.12
58.40	1	39.73	1	25.63	1	28.10
60.78	1	40.65	1	27.00	1	29.37
61.58	1	44.75	1	30.74	2	30.85
64.06	1	45.75	1 +	32.18	1	31.30
64.94	1	49.68	1	32.71	2	34.42
66.01	3	52.89	1 +	34.69	1 +	35.05
67.40	1	53.67	1	35.02	1 +	36.22
68.69	2	55.07	1	35.76	2	36.33
69.18	1	56.22	1	36.87	1 +	38.89
69.58	2	58.03	1	36.98	1 +	39.40
70.74	1	59.32	1	38.97	1	39.50
71.35	2	59.53	1	42.61	1	42.88
76.64	1	60.76	1 +	52.46	1	45.49
77.95	1	61.26	2	54.31	1	46.05
78.43	1	61.53	1 +	56.90	1	47.41
78.70	1	62.84	1	57.55	1 d	49.63
82.57	3	63.35	1 +	59.26	3	50.31
84.80	2	64.24	1	60.45	1	51.11
85.05	1 +	64.56	1	61.75	1	55.01
85.55	1	68.00	1	67.00	2	56.37
87.19	1	71.26	1	68.45	4	59.79
87.78	1	74.13	1	71.25	1	61.50
89.45	2	79.30	1	77.94	2	62.40
90.25	1	79.68	1	81.06	2	62.85

3668.05	2	3739.30	10	3783.50	1	3839.16	2
70.98	8 v	41.42	4	83.63	1	39.37	2 +
72.35	1	44.01	5	84.00	1	40.62	3 d
74.20	1	45.77	5	85.49	1	43.66	3
76.97	1	47.75	3	87.32	2	43.92	2
77.82	2	48.77	1	88.29	3	44.65	1
78.23	1 +	50.82	1	90.95	1	46.16	1
80.13	1	51.69	1	91.45	2	47.67	2
81.13	1	53.20	1 +	92.20	2	48.95	2
81.89	2	54.33	1 +	92.75	1	49.13	2
87.25	1	54.78	1	94.14	3	52.05	2
88.56	1 Eu?	54.97	1	94.51	1	54.39	3
90.24	1	55.40	3	96.31	1 +	54.74	3
91.10	1	56.17	1	97.44	1	56.08	3
92.38	2	56.53	2	97.90	4	58.06	2
92.94	1	56.66	2	99.71	3	62.20	1
93.03	1 +	57.65	3	3800.20	1 +	62.37	1
94.13	3	58.60	2	00.51	1	65.35	2 +
94.45	1	59.12	3	01.05	3	71.94	2
3700.33	1	60.18	2	03.23	1 +	73.36	1
00.71	2	60.83	4	04.10	1	75.30	2
01.06	2	62.74	2	04.87	1	75.67	2
01.70	1	64.51	3	05.76	2	77.32	1
05.18	1	65.56	1	08.05	1	80.90	2
06.89	2	67.53	2	08.59	2	81.52	2
07.11	2 r	67.87	2	09.90	2	82.65	1
08.52	2	68.04	1	10.05	2	83.93	1
08.80	3	68.38	1	10.60	2	85.47	5 r
09.64	1	70.86	1	12.22	3	86.05	1
11.00	1	71.50	1	13.77	1	87.27	1
11.70	3	72.30	1	14.72	2	89.32	3
12.25	2	72.80	2	21.97	2	90.24	3
12.91	2	73.57	2	23.17	1 +	91.34	2
19.02	4	74.46	2	23.95	1 (Cy)	94.20	2
20.72	1	74.85	2	24.35	2	95.25	1
22.00	3	76.20	1 + br	24.70	2	95.60	1
24.17	1	77.25	1	25.13	1	97.12	4
25.03	3	78.00	1	26.36	3	97.32	1 +
26.38	1	78.29	3	26.68	1	3901.04	2
26.93	1	78.90	1 +	27.00	1 +	02.46	1
27.50	1	79.69	1	27.49	1	03.60	4
28.61	4	80.30	1	28.20	1	06.93	1
29.05	1	80.66	1	29.55	1 +	07.29	1 Eu?
29.90	2	80.93	2	30.45	2	10.25	1
31.42	4	81.07	2	31.65	3	11.06	1
36.10	4	81.79	1	33.99	3	13.14	1
37.25	3	82.50	1	34.74	3	13.53	1
37.60	2	82.81	1	35.85	2	13.76	1
38.12	2	83.22	1	36.66	2	16.51	1